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DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69-A HAGOOD AVENUE
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

January 21, 2011

Regulatory Division

Mr. Ronald B. Clary
Vice President
SCE&G New Nuclear Deployment
Post Office Box 88
MC P-40
Jenkinsville, South Carolina 29065

Dear Mr. Clary:

Attached please find an executed copy of the *Cultural Resources Management Plan and Agreement among The South Carolina Department Of Archives And History, State Historic Preservation Office; The U.S. Army Corps Of Engineers; and South Carolina Electric & Gas Company (SCE&G) regarding The V.C. Summer Nuclear Station Units 2 And 3 Site and associated New 230 KV SCE&G Transmission Lines*. This *Plan* and *Agreement* will serve as a guide for managing and protecting previously identified, and as yet unidentified, cultural resources associated with the Killian, Lake Murray, and St. George transmission line routes that are proposed to serve two new nuclear units at the V.C. Summer Nuclear Station. The *Plan* and *Agreement* is executed as part of the coordination between the U.S. Army Corps of Engineers and the State Historic Preservation Officer (SHPO) pursuant to Section 106 of the National Historic Preservation Act of 1966.

Please note that the proposed construction of elements of the V.C. Summer Nuclear Station and all associated transmission lines are subject to the issuance of a Department of the Army permit. Therefore, this *Plan* and *Agreement* does not constitute permission to construct the project, but will be referenced in any future permit documents. Note also that additional conditions may be included in a subsequent permit depending on additional information and based on further coordination with the SHPO during the Department of the Army permit review process.

If you have any questions concerning this matter, please contact Richard Darden at 843-329-8043 or toll free at 1-866-329-8187.

Sincerely,

Jason A. Kirk, P.E.
Lieutenant Colonel, U.S. Army
District Commander

Tina B. Hadden
Chief, Regulatory Division

Enclosure

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SOUTH CAROLINA ELECTRIC & GAS COMPANY

Columbia, South Carolina

CULTURAL RESOURCES MANAGEMENT PLAN and AGREEMENT

among

THE SOUTH CAROLINA DEPARTMENT OF ARCHIVES AND HISTORY, STATE HISTORIC PRESERVATION OFFICE; THE U.S. ARMY CORPS OF ENGINEERS;

and

SOUTH CAROLINA ELECTRIC & GAS COMPANY (SCE&G)

regarding

THE V.C. SUMMER NUCLEAR STATION UNITS 2 AND 3 SITE

and associated

NEW 230 KV SCE&G TRANSMISSION LINES

October 2010

Revision 0

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CULTURAL RESOURCES MANAGEMENT PLAN and AGREEMENT
among
THE SOUTH CAROLINA DEPARTMENT OF ARCHIVES AND HISTORY,
STATE HISTORIC PRESERVATION OFFICE; THE U.S. ARMY CORPS OF ENGINEERS;
and
SOUTH CAROLINA ELECTRIC & GAS COMPANY (SCE&G)
regarding
THE V.C. SUMMER NUCLEAR STATION, UNITS 2 AND 3 SITE
and associated
NEW 230 KV SCE&G TRANSMISSION LINES

I. INTRODUCTION AND BACKGROUND INFORMATION

To maintain an adequate supply of reliable, electrical energy to serve the projected future demand throughout central and southern South Carolina, South Carolina Electric & Gas Company ("SCE&G") and the South Carolina Public Service Authority ("Santee Cooper") submitted an application on March 31, 2008 to the United States Nuclear Regulatory Commission ("NRC") for a combined Construction and Operating License ("COL") for two nuclear generating units, each having a net electrical output of 1117 megawatts. The two new nuclear generating units will be constructed at the V.C. Summer Nuclear Station ("VCSNS") site in Jenkinsville, SC and will be called VCSNS Units 2 and 3.

The NRC has prepared and published Environmental Standard Review Plans ("ESRPs") for the guidance of the NRC staff responsible for environmental reviews for nuclear power plants. These documents are made available to the public as part of the Commission's policy to inform the nuclear industry and the general public of regulatory procedures and policies. ESRPs are not substitutes for regulatory guides or the NRC's regulations, and compliance with them is not required. The ESRPs are keyed to preparation of Environmental Reports for Nuclear Power Stations. NUREG-1555 is the Environmental Standard Review Plan for New Site / Plant Applications and requires the identification of any "....historic properties within 16 km (10-mi.) of the plant site and within 2 km (1.2-mi.) of proposed transmission line routes, access corridors, and offsite areas that are in or have been determined eligible for inclusion in the National Register of Historic Places ("NRHP") or are included in State or local registers or

inventories of historic and cultural resources.....". Moreover, NUREG-1555 provides guidance on specific studies, information and types of data that must be conducted and considered in order to determine the types and magnitude of potential impacts to cultural resources that may result from proposed actions.

Planned construction of the two new nuclear generating units at the existing V.C. Summer Nuclear Station will result in the placement of fill in waters of the United States. Additionally, new transmission lines that must be constructed in conjunction with the new nuclear generating units will cross federal and state navigable waters and will result in the conversion of forested wetlands to permanent herbaceous wetlands. Thus, the planned action will require federal permitting pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 and is, therefore, considered to be a federal undertaking.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, the effects of any federal undertaking on historical resources must be considered prior to the beginning of any construction. As part of their responsibilities related to the federal permits under their jurisdiction (Section 404 and Section 10 Permits), the U.S. Army Corps of Engineers ("USACE") has entered into consultation with the South Carolina State Historic Preservation Officer ("SHPO") to discuss the management of cultural resources as it relates to this project and compliance with Section 106 of the National Historic Preservation Act. This document provides a Management Plan that is intended to present the steps that SCE&G will implement and follow to protect cultural resources when constructing and operating the V. C. Summer Nuclear Station (VCSNS) Units 2 and 3 and associated transmission lines.

The USACE is a "cooperating agency" within the context of the National Environmental Policy Act where the NRC is serving as the lead agency preparing an EIS for the federal action related to issuance of a COL. The USACE must satisfy NEPA requirements and its internal regulations regarding consultation obligations associated with its Section 404 and Section 10 Permit decisions, which includes consultation with the SHPO regarding Section 106 compliance and is, therefore, a signatory to this Cultural Resources Management Plan and Agreement.

II. MANAGEMENT PLAN AND AGREEMENT SCOPE

The Scope of this Management Plan and Agreement applies to the VCSNS Units 2 and 3 site (the tract of land on which the VCSNS Units 2 and 3 will be constructed) and the four (4) specific SCE&G 230 kV transmission lines discussed herein. It addresses how SCE&G will identify, assess, and protect cultural resources that could potentially be impacted by the construction, operation and maintenance of the VCSNS Units 2 and 3 and associated transmission lines.

Part A: V. C. Summer Nuclear Station Site

SCE&G and the South Carolina Public Service Authority ("Santee Cooper") submitted an application on March 31, 2008 to the NRC for a combined construction and operating license ("COL") for two nuclear generating units, each having a net electrical output of 1117 megawatts. The COL, once approved, would authorize SCE&G and Santee Cooper to build and operate up to two additional nuclear generating units at the utilities' existing V.C. Summer Nuclear Station (Unit 1) site in Jenkinsville, SC, provided, however, that all other applicable licensing, certifications, and permits are properly issued prior to the beginning of activities for which they are required. The planned VCSNS Units 2 and 3 will be located approximately one mile south-southwest of the existing VCSNS Unit 1 (Figure 1).

Part B: Transmission Lines

Santee Cooper and SCE&G each must build new 230 kV transmission lines to connect the electrical switchyards at the V.C. Summer Nuclear Station (Units 1, 2 and 3) to their respective transmission networks. Santee Cooper must build two (2) new 230 kV transmission lines and SCE&G must build four (4). This Management Plan and Agreement only addresses the four (4) new SCE&G transmission lines; Santee Cooper's lines will be addressed under a separate agreement. The following is a description of SCE&G's lines:

VCSNS-Killian 230 kV Line

This SCE&G single-circuit line will be routed between the existing VCSNS Unit 1 Switchyard and SCE&G's existing Killian Substation. Based on a comprehensive siting study conducted by SCE&G, the line route will utilize both existing and new rights-of-way, and the length will be approximately 37-miles long. This line will be referred to as the VCSNS-Killian Line throughout this document.

VCSNS–Lake Murray #2 230 kV Line

This SCE&G line will be routed between the VCSNS Units 2 and 3 Switchyard and SCE&G's existing Lake Murray Transmission Substation. This new line will be constructed entirely within existing SCE&G rights-of-way and the length will be approximately 22-miles long. This line will be referred to as the VCSNS-Lake Murray #2 Line throughout this document.

VCSNS–St. George #1 and #2 230 kV Lines

The VCSNS-St. George #1 and #2 230 kV lines will be routed between the VCSNS Units 2 and 3 Switchyard to a new 230/115kV transmission substation that will be built on property owned by SCE&G near St. George, SC. The two new lines will be constructed within existing SCE&G rights-of-way and will be approximately 94-miles long. Construction within the existing rights-of-way will be a combination of removing and rebuilding existing single pole, single circuit structures and replacing with single pole, double circuit structures or building a new single pole, double circuit within the existing right-of-way. These two new lines will be referred in this document as the VCSNS-St. George lines.

III. STIPULATIONS

Part A: V. C. Summer Nuclear Station Site

As part of the evaluations conducted for the COL, Section 404 and Section 10 Permits, SCE&G has performed cultural resource surveys of all land potentially impacted by construction activities at the VCSNS Units 2 and 3 site (Section IX). Survey reports have been submitted to the NRC and the SHPO. There are no known sites eligible for listing on the National Register of Historic Places or potentially eligible for listing in the areas where land disturbance is planned; there are eligible or potentially eligible sites located outside planned ground disturbance areas. Eligible or potentially eligible sites have been located on site plan drawings as "environmentally sensitive areas" and have been marked in the field with signage. To further protect these sites, awareness training on "environmentally sensitive areas" has been added to the construction site orientation training, which is mandatory for all personnel working on the construction project. Since all areas of potential ground disturbance within the construction site have been surveyed, the discovery of cultural resources during construction is not anticipated; however, if unanticipated cultural resources are discovered during construction activities, construction activities in that area will be halted and not resumed without consultation with the SHPO. If

human remains are discovered, construction will not be resumed until the SHPO and appropriate law enforcement agencies have been notified and proper consultation has occurred. After construction of Units 2 and 3 is completed, cultural resource protection programs for the construction site will be combined with existing VCSNS Unit 1 procedures.

Part B: Transmission Lines (Existing and New Rights-of-Way)

GENERAL

All new SCE&G 230 kV lines, except in cases where existing ones are being replaced by new ones that are determined to be a "like facility" by the S.C. Public Service Commission, must be sited pursuant to the S.C. Utility Facility Siting and Protection Act ("Act"), Code of Laws Title 58 (Section 58-33-10 et Seq), SC Code, Ann. (1976, as Amended) regarding licensing a "major utility facility". Before commencing construction of a major utility facility, which includes 230 kV lines by definition, SCE&G must file for and receive a Certificate of Environmental Compatibility and Public Convenience and Necessity from the South Carolina Public Service Commission pursuant to the Act. SCE&G's policy and standard practice is to execute its comprehensive, three-phase transmission line siting process when siting new or portions of new 230 kV lines that require the acquisition of right-of-way easements within new corridors. The siting process includes consideration of an array of environmental, land use, cultural resource, and aesthetic factors when developing alternate routes, evaluating them, and selecting final routes. All documented cultural resources within siting study areas are mapped, weighted to reflect sensitivity to transmission line construction, and applied in the siting study. Moreover, it is SCE&G's practice to conduct "windshield surveys" throughout siting study areas when executing its transmission line siting process for the purpose of identifying above ground resources that may not be documented but are, nevertheless, judged by expert investigators to be eligible or potentially eligible for the NRHP. Once final routes have been selected and their precise locations have been surveyed, SCE&G contracts with qualified cultural resource consulting firms to conduct detailed surveys within the rights-of-way, including any portions of existing SCE&G transmission line rights-of-way that will be utilized by the proposed line or lines. The completed cultural resources investigations are used by SCE&G as guidance in avoidance and mitigation planning, therefore, application of SCE&G's transmission line siting process ensures that SCE&G will meet or exceed the requirements of the Act when siting new corridors for 230 kV line routes.

LIMITING FACTORS

SCE&G does not acquire title to the property occupied by its transmission lines. Rather, right-of-way easements are acquired for a specified area on individual properties that give SCE&G the rights necessary to construct, operate and maintain its transmission lines in perpetuity.

The terms and conditions of the rights-of-way (or easement) agreements provide owners of the property crossed by SCE&G transmission line rights-of-way a broad range of uses within these rights-of-way, such as farming and limited land grading. These and other uses may destroy or adversely affect sensitive cultural resource sites on transmission line rights-of-way that SCE&G commits to protect within the scope of its operations pursuant to this Cultural Resources Management Plan and Agreement. Although SCE&G cannot impose limitations on property owners from whom right-of-way is acquired that would ensure protection of cultural resources, SCE&G will practice prudent avoidance and take all reasonable measures to avoid any effects to cultural resources within its rights-of-way over private properties.

INADVERTENT DISCOVERIES

If unanticipated cultural materials are discovered during archaeological investigations within new or existing SCE&G rights-of-way for the four (4) SCE&G transmission lines, SCE&G or SCE&G's cultural resource investigator will notify the SHPO and the USACE and immediately consult with them to determine whether additional investigations or excavations are needed.

If unanticipated cultural materials are discovered during construction within the rights-of-way for the four (4) SCE&G transmission lines, SCE&G will suspend operations that could adversely affect the materials, notify the SHPO and the USACE, and consult with their cultural resource investigator regarding actions to be taken to assess the materials and any needed investigations and / or excavations.

If human remains are found or suspected during archaeological investigations or construction, SCE&G will immediately suspend activities, protect the area and contact the appropriate law enforcement agencies, the SHPO and the USACE. Subsequent consultation with the law enforcement agency and the SHPO will determine appropriate actions to be taken regarding the discovery.

IV. MANAGEMENT PLAN EXECUTION

Collection and evaluation of cultural resource data associated with the SCE&G transmission lines will be conducted according to the methodology described in this section (Section IV). The onsite cultural resource investigations associated with the VCSNS Units 2 and 3 site have previously been completed as discussed in Section III, Part A and in the Environmental Report submitted with the COL application.

1) Acquisition and application of baseline data regarding documented cultural resources associated with the SCE&G transmission lines (Section II, Part B).
   a) Upon request, the SHPO will provide SCE&G its current GIS database consisting of all known historical and archaeological resources in the counties within which SCE&G's individual siting study areas and / or existing rights-of-way reside.
      i) SCE&G will apply the SHPO GIS data in its siting studies in a rational, systematic manner that is designed to apply prudent avoidance practices for the purpose of minimizing likely adverse effects to architectural and archaeological resources that would result from the construction of the new transmission lines.
      ii) While siting new corridor portions for the new 230 kV transmission lines associated with VCSNS Units 2 and 3, SCE&G will collaborate with the SHPO regarding the possible collection of cultural resource data and information from Tribal Historic Preservation Officers ("THPO").
         (1) Any information received from THPOs will be appropriately considered and applied in the siting studies that will determine any new corridor portions of the final routes for the transmission lines associated with VCSNS Units 2 and 3.
   b) Execution of a "windshield survey".
      i) Upon SCE&G's completion of its comprehensive three-phase transmission line siting study for any new corridor portions and the selection of final routes, to include any existing SCE&G rights-of-way to be utilized for the four (4) new transmission lines, SCE&G will contract with a professional meeting the Secretary of the Interior's *Professional Qualifications Standards* in history or architectural history to conduct a "windshield" reconnaissance level architectural survey within the Area of Potential Effect (APE) relative to each of the three (3) line routes for the four (4) SCE&G transmission lines.
      ii) The key objectives of the windshield reconnaissance surveys will include the following:

(1) Visually assess all previously recorded architectural resources that are visible from public roads (if any);

(2) Identify any previously recorded architectural resources that no longer exist when such confirmation can be made by visual inspection from public roads or analysis of currently available aerial photography;

(3) Locate architectural resources or other above ground features not previously recorded that visually appear eligible, based on age and condition, to meet requirements for inclusion on the NRHP; and,

(4) Determine what effects, if any, construction and operation of the future lines may have on historic resources.

iii) The windshield survey will include an inventory of architectural resources within the area of potential effect ("APE"). The APE will extend 2-kilometers from the three (3) centerlines of the selected final routes for the four (4) planned transmission lines. The windshield reconnaissance survey will comply with the requirements set out in the South Carolina Survey Manual, including the completion of survey cards for all buildings that are fifty (50) years of age or older.

(1) As outlined in National Register Bulletin #24, windshield reconnaissance level surveys are useful in ascertaining "a general picture of the distribution of different types and styles [of architectural resources], and of the character of different neighborhoods" (Parker 1985:35-36). Windshield surveys are also useful for making preliminary assessments of eligibility based on the architectural integrity of properties, but not in ascertaining the historical associations a property might possess.

c) Comprehensive archaeological investigations along selected routes.

i) Following the selection and actual surveying of the selected final routes for the four (4) future transmission lines, including any existing SCE&G rights-of-way to be utilized, SCE&G will contract with a professional meeting the Secretary of the Interior's *Professional Qualifications Standards* in archaeology to conduct comprehensive cultural resource investigations within these rights-of-way.

(1) If existing, cleared SCE&G rights-of-way are utilized, the area investigated will include the area where ground disturbance will occur or within specific areas to be disturbed as determined in consultation between SCE&G, the SHPO, and the USACE, whichever is less. It is anticipated that the extent of ground disturbance within existing, cleared rights-of-way will occur only at planned new structure

locations and along new access roads requiring grading. It should be noted that SCE&G does not anticipate that it will be necessary to construct new access roads that will require grading.

(2) If the rights-of-way are new ones requiring new right-of-way easement agreements or existing unoccupied SCE&G rights-of-way that have not been cleared or investigated for cultural resources, the investigation will include the entire area within the new rights-of-way.

ii) The key objectives of the cultural resource investigations will be:

(1) To determine the location of any documented or undocumented cultural resources in the existing or new rights-of-way upon which the four transmission lines will be built.

(2) To determine what effects, if any, construction and operation of the future lines may have on archaeological and / or historic resources.

(3) To provide the information that can be used in the development of avoidance plans and / or mitigation measures.

iii) The execution methodology for the comprehensive archaeological investigations will include the following:

(1) Preparation of a study plan for submittal to and approval by the SHPO;

(2) Acquisition of the current SHPO GIS database consisting of all known historical and archaeological resources in the counties within which the four (4) new SCE&G transmission lines will be located.

(a) As necessary, the background research will include a review of the South Carolina archaeological site files in Columbia to determine the location and nature of any documented cultural resources in the vicinity of the selected transmission line routes.

(b) The background research will include a review of any reasonably available historical maps and documents for the regions through which the four (4) future transmission lines will run.

iv) The field investigations will involve systematic pedestrian inspections within the rights-of-way for the four (4) future transmission lines in the locations described herein above for existing and new rights-of-way using methods contained in the study plan and approved by the SHPO and USACE prior to the commencement of work.

(1) The investigations will include a combination of surface and subsurface observations to identify archaeological sites. All areas of exposed ground will be examined for artifacts and other evidence of past human activities. Subsurface observations will be made using shovel test (30 cm in diameter) excavations spaced at 30 meter intervals unless observed conditions dictate more intensive testing.

v) The archaeological surveys will include laboratory analysis of any artifacts found. The analysis will include the cleaning and identification of all recovered artifacts to determine the age and possible function of any archaeological sites identified.

(1) These data are necessary to provide adequate information regarding NRHP eligibility recommendations.

(2) SCE&G and / or its cultural resource investigator will consult with the South Carolina Institute of Archaeology and Anthropology and the SHPO regarding permanent curation of any recovered artifacts. The items prepared and presented for curation will include, but may not be limited to, material remains recovered (primarily artifacts, but includes anything recovered as a result of archaeological investigation), associated records produced (field notes and forms, analytical forms and cataloging systems, photographic records, documents, digital and electronic data, metadata, etc.), and publications resulting from those investigations.

vi) Documentation of cultural resource investigations.

(1) A "draft" report documenting the cultural resource investigations for each of the four (4) SCE&G transmission lines (windshield reconnaissance surveys and archaeological surveys) will be prepared that details the survey methodology and findings (a single report will be prepared for the VCSNS-St. George #1 and #2 Lines). Each report will include a brief overview of the natural and archaeological setting of the project area as well as a summary of any previous investigations in the region. Site descriptions will include individual maps.

(a) If any of the 230 kV line routes included in this Cultural Resources Management Plan and Agreement are sited in phases, reports may be prepared for each phase along the total length of each line.

(2) Using the data compiled during the background search, field investigations, and laboratory analyses, sites will be classified as eligible or ineligible for the NRHP

and the mapping included in each report will include GIS shape files that delimit the sites.

(3) The report will also include mitigation recommendations for any significant sites that may be affected by any of the four (4) SCE&G transmission lines.

(4) Following SCE&G's review of the draft report, it will be forwarded to the SHPO on SCE&G's behalf by the cultural resource investigator, and following SHPO concurrence with the report's findings, the report status will be changed from "draft" to "final" and will be published.

(a) Five bound copies and one electronic file of the final report will be delivered to SCE&G by the cultural resource investigator; the SHPO and USACE will be provided electronic and bound copies as requested.

vii) In the event cultural resource investigations conducted on SCE&G's behalf identify historical or archaeological properties that are not included in the SHPO's GIS database, SCE&G will provide the site location to the SHPO for inclusion in its GIS database in accordance with the "South Carolina Standards and Guidelines for Archaeological Investigations" and the "South Carolina Statewide Survey of Historic Properties Survey Manual."

V. TRAINING AND EDUCATION

SCE&G will educate its personnel and / or contractors engaged in the construction, maintenance or operation of any of the four (4) transmission lines included in this Cultural Resources Management Plan and Agreement. SCE&G will furnish personnel engaged in construction, operations and/or maintenance activities within the rights-of-way of any of the four (4) transmission lines with mapping and other information that provide appropriate field identification of sensitive cultural resource sites and/or areas and will instruct them to practice appropriate avoidance in the identified areas.

Marking of any significant archaeological sites within any of the rights-of-way along the routes for the four (4) transmission lines will be as agreed upon with SHPO. It is understood, however, that marking of the sites may be subject to property owner consent since the placement of physical markers could introduce visual elements or obstructions to land use that are not explicitly allowed under the terms of SCE&G's right-of-way easement agreements. Upon refusal by property owners to allow marking of cultural resource sites, SCE&G will employ

other reasonable means to make their employees and contractors aware of sensitive locations, including the utilization of electronic mapping and global positioning technology.

VI. POST CONSTRUCTION LINE OPERATIONS AND MAINTENANCE

Normal right-of-way and line maintenance activities for established transmission line rights-of-way have extremely low potential for ground disturbance; nevertheless, routine operations and maintenance activities will be conducted according to SCE&G's long-standing practices that are designed to promote long-term vegetative stabilization on rights-of-way and minimum disturbance to soils.

VII. EMERGENCY RESPONSE

This Cultural Resources Management Plan and Agreement recognizes that power outages caused by transmission line failures are extremely critical to the general public health, safety and welfare because of the high numbers of people and businesses that are typically affected. As such, in times of emergency, the following approach shall be practiced:

1. When transmission lines must be repaired during times of emergencies that may result from hurricanes, tornados, ice, lightning, floods, etc., SCE&G will strive to avoid sensitive cultural resource sites that may reside in its rights-of-way; however, this Cultural Resources Management Plan and Agreement acknowledges that sensitive sites could exist and it may not always be possible to avoid these sites during emergency power restoration work.

2. Following any emergency restoration work, SCE&G will inspect the affected areas of the rights-of-way to determine if disturbance has occurred to any cultural resource site that has been previously documented in SCE&G's records following the investigations described in Section IV, hereinabove.

3. If sensitive sites have been disturbed during the emergency power restoration activities, SCE&G will notify the SHPO and USACE and consult with its cultural resource consultant to review and determine what steps may be taken to repair and restore the damaged site.

4. If site restoration is possible, SCE&G and SHPO will agree upon the restoration plan and SCE&G will take action to restore the site.

5. If the site is damaged beyond repair or restoration, SCE&G will consult with the SHPO regarding a retrieval plan. The retrieval plan will include consultation with the underlying property owner and include appropriate approval or concurrence from the property owner. Once the parties are in agreement with the plan, retrieval and agreed upon disposition of site findings (recovered artifacts) will proceed.

VIII. DISPUTE RESOLUTION

Should SCE&G or the SHPO object to any plan or action proposed or taken by the other party pursuant to this Cultural Resources Management Plan and Agreement, they shall notify the other party of the objection promptly in writing (email correspondence from authorized persons to authorized persons can constitute written notification). Upon notification by either party of an objection to a plan or action pursuant to this Cultural Resources Management Plan and Agreement, both the SHPO and SCE&G shall agree to a time and place for a meeting to be held expeditiously, but in no case more than fourteen (14) days from the date of the written objection.

The SHPO and SCE&G will negotiate in good faith to resolve the objection. If either party determines the objection cannot be resolved in a timely manner, both parties will forward all documentation relevant to the objection, including each party's proposed resolution to the dispute, to the USACE with a copy of the transmittal to the NRC. The USACE shall notify the parties of any additional information needed to consider the objection within fourteen (14) days of receipt of the notification that an objection has been raised and cannot be resolved by the parties. The USACE will provide its final direction on the resolution of the objection within thirty (30) days of receiving adequate documentation. The direction of the USACE shall be final and binding on all signatories to this Cultural Resources Management Plan and Agreement.

The SHPO, SCE&G and USACE each agree that responsibilities to carry out all other actions subject to the terms of this Cultural Resources Management Plan and Agreement that are not the subject of the objection remain unchanged and will continue during dispute resolution.

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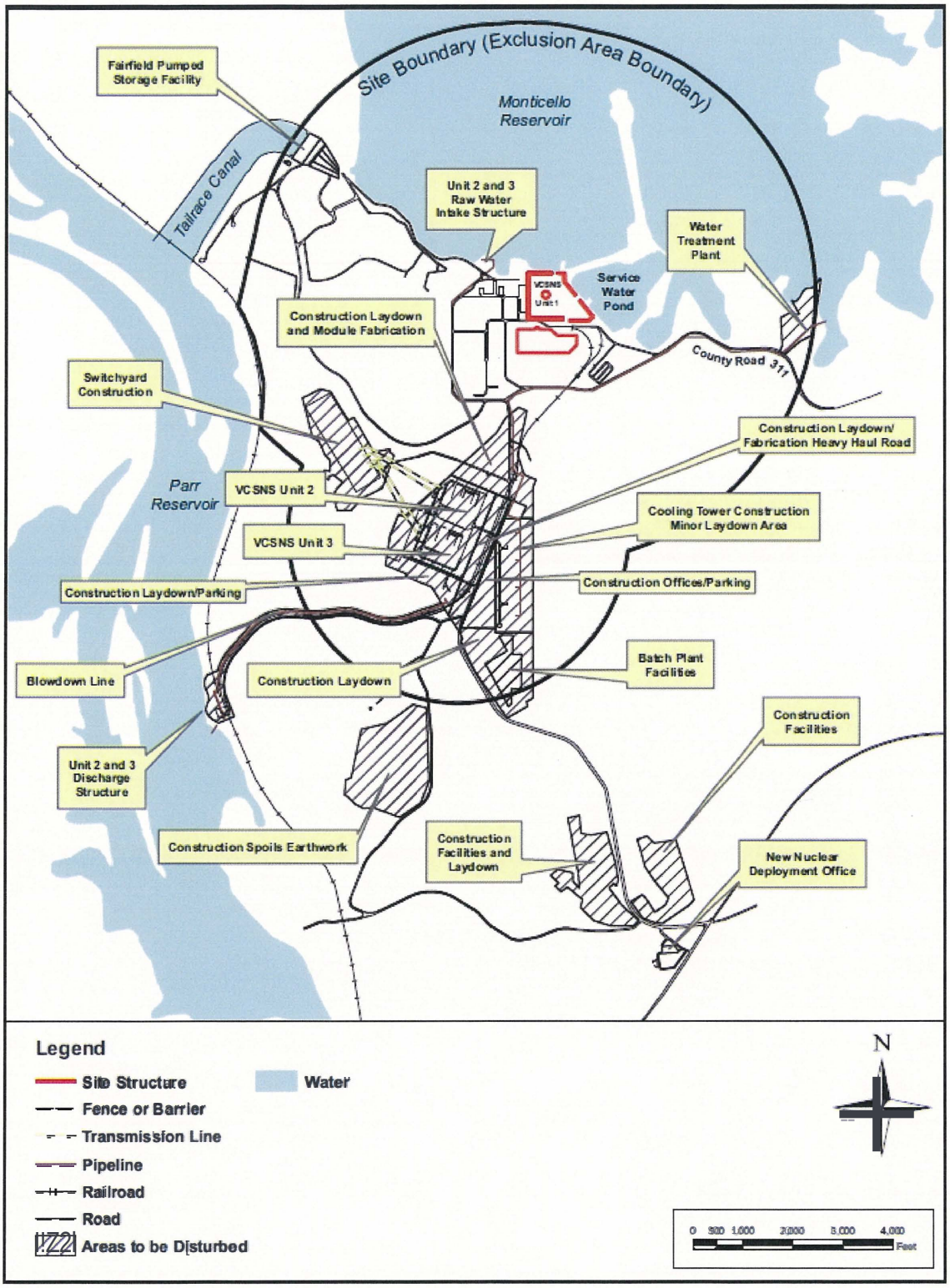

Figure 1. VCSNS Site and Proposed Plant Footprint

CULTURAL RESOURCES MANAGEMENT PLAN and AGREEMENT
among
THE SOUTH CAROLINA DEPARTMENT OF ARCHIVES AND HISTORY,
STATE HISTORIC PRESERVATION OFFICE; THE U.S. ARMY CORPS OF ENGINEERS;
and
SOUTH CAROLINA ELECTRIC & GAS COMPANY (SCE&G)
regarding
THE V.C. SUMMER NUCLEAR STATION UNITS 2 AND 3 SITE
and associated
NEW 230 KV SCE&G TRANSMISSION LINES

WHEREAS, South Carolina Electric and Gas Company (SCE&G) and the South Carolina Public Service Authority ("Santee Cooper") submitted an application on March 31, 2008 to the Nuclear Regulatory Commission (NRC) for a combined construction and operating license ("COL") for two nuclear generating units, each having a net electrical output of 1117 megawatts. The COL, once approved, would authorize SCE&G and Santee Cooper to build and operate up to two additional nuclear generating units at the utilities' existing V.C. Summer Nuclear Station site in Jenkinsville, SC, which will be a federal undertaking due in part to fill that must be placed in waters of the United States; and,

WHEREAS, as part of their responsibilities related to the federal permits under their jurisdiction (Section 404 and Section 10 Permits), the U.S. Army Corps of Engineers ("USACE") is a "cooperating agency" and has entered into consultation with the South Carolina State Historic Preservation Officer ("SHPO") to discuss the management of cultural resources as it relates to this project and compliance with Section 106 of the National Historic Preservation Act.

WHEREAS, pursuant to Section 106 of the National Historic Preservation Act of 1966, the State Historic Preservation Officer ("SHPO") participates in the review of all federal undertakings that have the potential to impact historic and archaeological resources listed in, or eligible for listing in, the National Register of Historic Places ("NRHP"); and,

WHEREAS, to ensure compliance with Section 106 of the National Historic Preservation Act, the SHPO, USACE and SCE&G have cooperated to develop this Cultural Resources Management Plan and Agreement that will define the procedures that will be implemented to identify and protect cultural resources that could potentially be impacted by construction, operation and maintenance of the V. C. Summer Nuclear Station ("VCSNS") Units 2 and 3 and the four (4) planned transmission lines that are directly associated with the operation of VCNS Units 2 and 3.

NOW, THEREFORE, SCE&G, the SHPO and USACE agree by executing this Agreement that all undertakings associated with construction, maintenance and operation of the VCSNS Units 2 and 3 and the construction, operation and maintenance of the four planned transmission lines directly associated with operation of the VCSNS Units 2 and 3 will be carried out in accordance with the stipulations contained in this Cultural Resources Management Plan and Agreement.

SOUTH CAROLINA STATE HISTORIC PRESERVATION OFFICER

By________________________________ Date________________

SOUTH CAROLINA ELECTRIC AND GAS COMPANY - New Nuclear Deployment

By________________________________ Date________________

SOUTH CAROLINA ELECTRIC AND GAS COMPANY - Electric Operations

By________________________________ Date________________

U. S. ARMY CORPS OF ENGINEERS

By________________________________ Date________________

February 6, 2012

Dwight Hollifield
Pike Energy Solutions, LLC
10101 Claude Freeman Dr.
Suite 100-W
Charlotte, NC 28262

RE: Technical Memorandum for Record of No Significant Cultural Findings; Phase I Archaeological Resources Survey of the SCE&G VCS2-St. George 1 and 2 Line 1-Mile Extension, Richland County, South Carolina.

Mr. Hollifield,

We have completed background research and field investigations within the proposed 1-mile extension of the South Carolina Electric and Gas (SCE&G) VCS-2 St. George 1 and 2 230kV transmission line corridor located within Richland County, South Carolina. The proposed transmission line extension runs from an existing junction located west of the Riverbanks Zoo, approximately 1 mile northwest within the city limits of Columbia (Figures 1 and 2). This investigation was carried out for Pike Energy Solutions, LLC for the purpose of determining if any archaeological resources would be affected by ground disturbance associated with the construction and development of the newly proposed 230 kV transmission line extension.

All new SCE&G 230 kV lines associated with the VC Summer Nuclear Plant, except in cases where existing ones are being replaced by new ones that are determined to be a "like facility" by the S.C. Public Service Commission, must be sited pursuant to the S.C. Utility Facility Siting and Protection Act ("Act"), Code of Laws Title 58 (Section 58-33-10 et Seq), SC Code, Ann. (1976, as Amended) regarding licensing a "major utility facility". Before commencing construction of a major utility facility, which includes 230 kV lines by definition, SCE&G must file for and receive a Certificate of Environmental Compatibility and Public Convenience and Necessity from the South Carolina Public Service Commission pursuant to the Act.

Prior to the commencement of this investigation a cultural resources study plan was submitted by SCE&G and approved by the South Carolina State Historic Preservation Office (SCSHPO) and the US Army Corps of Engineers. This study plan addresses how SCE&G will identify, assess, and protect cultural resources which could be impacted by the construction, operation, and maintenance of the VCS2 St. George 1 and 2 230kV lines. The study plan stipulates that areas not previously cleared or surveyed (e.g. new rights-of-way) must be subjected to archaeological survey.

Field investigations for the proposed SCE&G VCS-2 St. George 1 and 2 230kV line 1-mile corridor were conducted on February 1, 2012. Methods employed by the field team included a thorough visual/pedestrian survey of the entire corridor as well as a shovel testing strategy designed to adequately cover the footprint. The shovel testing strategy employed by the archaeologist consisted of 52 shovel tests effected across the 1 mile corridor placed at roughly 30

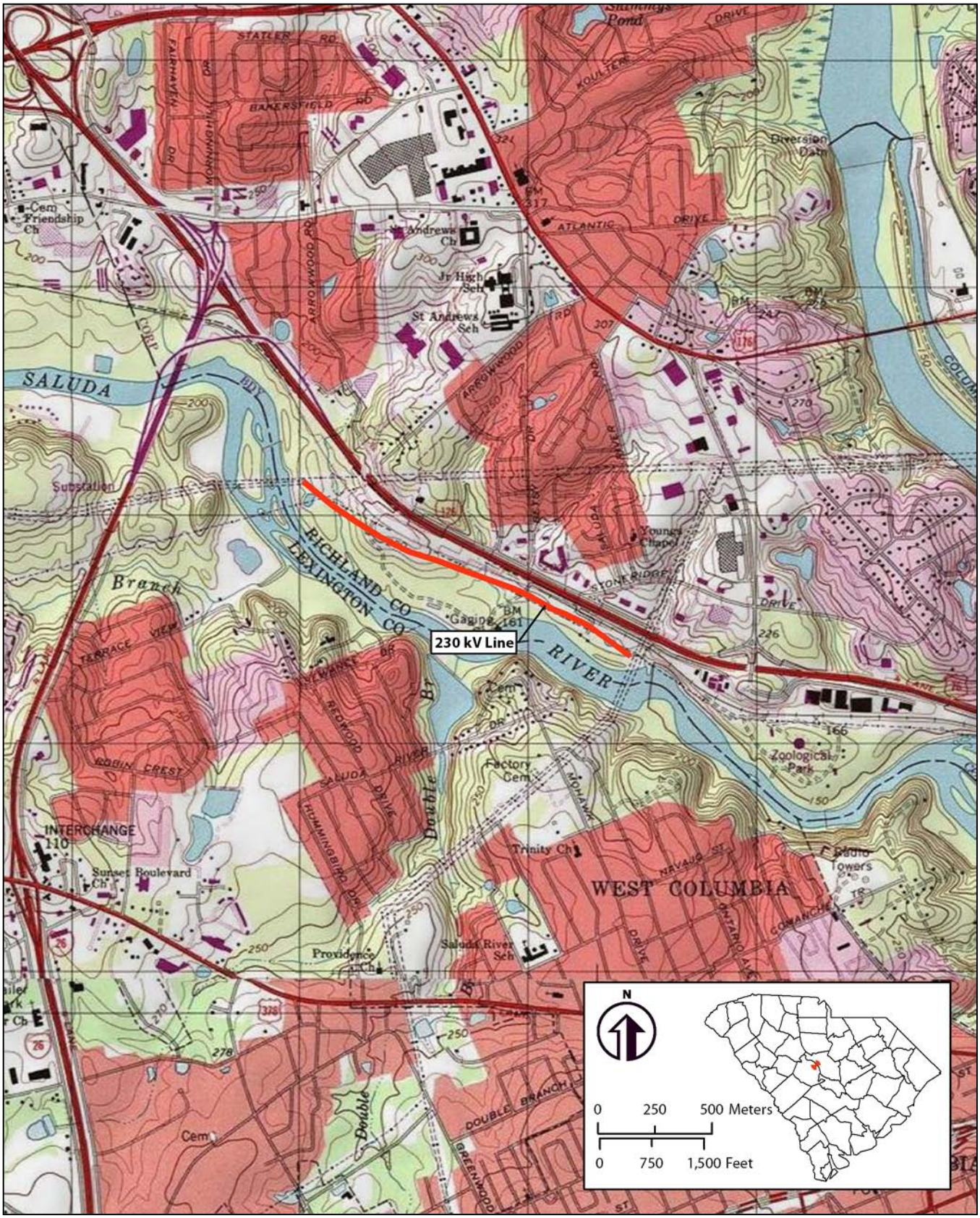

Figure 1 – USGS Location Map of the SCE&G VCS2-St. George 1 and 2 Line 1-Mile Extension, Richland County, South Carolina. (*7.5' USGS Quadrangle, North Columbia*)

Figure 2 – Aerial Photo Location of the SCE&G VCS2-St. George 1 and 2 Line 1-Mile Extension, Richland County, South Carolina.

meter intervals within the proposed footprint, defined as being a 100 ft wide corridor located approximately 125 feet south of an existing 115kV line owned by SCE&G. Visual/Pedestrian survey consisted of a close examination of the ground surface for signs of mounds, features, or artifacts. Field notes detailing the soil conditions of excavated shovel tests and disturbed conditions were logged in field notebooks. Photographs detailing the current status and environment of the project corridor were taken.

Figure 3 - Environmental Profile of the Southeastern Terminus of the SCE&G VCS2-St. George 1 and 2 Line 1-Mile Extension, Facing the Saluda River.

Background research was conducted at the South Carolina Institute of Archaeology and Anthropology (SCIAA) of Columbia, South Carolina to determine if any previously recorded archaeological sites exist within the footprint of the proposed corridor. In addition, the list of National Register of Historic Places (NRHP) properties was reviewed at the SCIAA. No previously recorded resource was identified within a .5-mile radius of the proposed corridor. It is anticipated that no previously recorded NRHP eligible or listed site will be affected by the proposed development.

Figure 4 - Environmental Profile of the SCE&G VCS2-St. George 1 and 2 Line 1-Mile Extension, Facing Northwest.

Additionally, a records search was made for documents pertaining to previously known, reported, and/or National Register of Historic Places (NRHP) nominated resources within a .5-mile (1.6 km) radius of the project corridor. An on-site assessment was also made based on topography, setting, previous regional surveys, and nearby resources as to the potential for the project corridor to produce as yet unidentified archaeological resources, or for the undertaking to have an effect on those not yet identified outside of the immediate parcel boundaries.

Richland County is located within the Sandhills region of South Carolina, along the Fall Line. The Fall Line separates the Piedmont and Coastal Plain. Kovacik and Winberry (1987:18) define the Sandhills as a narrow, discontinuous band of rolling hills,

with moderate relief. In some stretches of the Sandhills; however, the relief can reach as great as 61 meters. Bedrock within the project area is primarily composed of coarse grained granite, gneiss, and schist of Precambrian age (Lawrence 1978). Figures 3 and 4 provide views of the proposed corridor setting.

Today, the climate is characterized by hot, humid summers and moderately cold, but short, winters. Average temperatures vary from 25-58˚ F(minimum-maximum) in December to 71-91˚ F in July; however, the average annual maximum temperature for the year 102˚ F. Approximately 1.2 meters of precipitation, principally rain, falls in the region each year. Precipitation is most common in July to September (Lawrence 1978).

Figure 5 – Soil Conditions Encountered Within the Footprint of the SCE&G 1-Mile St. George 1 and 2 Extension, Showing Clays Present at the Surface.

In general, today's temperature and rainfall ranges are quite close to those of the Middle to Late Archaic past. However, we would expect there to have been slightly warmer average temperatures; perhaps only on the order of a degree or two. But rainfall may have been less abundant or some degree, less seasonal.

Soils within Richland County are typical of the Upper Coastal Plain and are characterized by well drained sandy loams. Numerous soil types were encountered within the proposed transmission line's ROW and they were generally shallow and poorly drained. The Figure at right displays the type of soils encountered within the footprint of the proposed corridor.

Results of the Field Survey

Field survey consisted of complete coverage of the VCS-2 St. George 1 and 2 line 1-mile extension corridor. The primary survey coverage methods consisted of pedestrian walkover and systematic shovel testing of the corridor in its entirety. A single pedestrian transect was placed at the southeastern terminus and continued northwest. Shovel tests were excavated every 30 meters (98 ft) offset, but were not excavated in areas judged to be highly disturbed or inundated. Shovel tests were augmented by visual inspection in areas with good surface visibility.

A total of 52 shovel tests were excavated within the proposed VCS-2 St. George 1 and 2 line 1-mile extension corridor (Figure 6). During the field survey, a vast majority of excavated

Figure 6 – Shovel Test Locations within the Footprint of the 1-Mile St. George 1 and 2 Extension. Flooding and Disturbance Noted within the Northwestern and Southeastern Termini Respectively.

shovel tests demonstrated deflated soils with mottled brownish red to light brown clay visible at the surface. No archaeological resources were identified below the surface. Furthermore, visual inspection did not identify any resources.

All field notes, records, photograph, and artifacts from this project are currently stored at the Atlanta office of Brockington and Associates, Inc. Project maps, field notes, photographic materials related to this project, and all recovered artifacts (upon completion of the review process for the project report) will be curated at the South Carolina Institute of Archaeology and Anthropology (SCIAA) of Columbia, South Carolina.

Summary and Conclusions

The archaeological resources survey for the proposed 1-mile extension of the VCS-2 St. George 1 and 2 line corridor resulted in no previously unrecorded archaeological resources being identified. In addition to this, background research did not locate any previously recorded archaeological resources being located within a .5-mile radius. As a result of this survey, Brockington and Associates has not identified any previously unrecorded archaeological resources, and no previously recorded archaeological resources will be impacted by the development of this corridor. No surface or in-ground features were observed within the corridor footprint. We therefore recommend that the undertaking be allowed to proceed as planned. There will be no effects to significant archaeological resources. If you have any questions regarding this report, or need further information, please do not hesitate to call. I can be reached at (678) 638-4118 or email at; AndrewPappas@Brockington.org.

Sincerely,

BROCKINGTON AND ASSOCIATES, INC.

Andrew A. Pappas, M.A., RPA
Principal Investigator

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January 9, 2012

Mr. Ralph Miller
Pike Energy Solutions, LLC
10101 Claude Freeman Dr.
Suite 100-W
Charlotte, North Carolina 28262

RE: Cultural Resources Literature Review and Windshield Reconnaissance for the VCS2-St. George Line 1&2 Comprehensive (06211-000)

Dear Mr. Miller,

In February 2011, Brockington and Associates, Inc. contracted with Pike Energy Solutions, LLC to conduct a cultural resources literature review and an architectural windshield reconnaissance for the proposed VCS2-St. George 230kV Line #1 (St. George #1) and the VCS2-Lake Murray 230kV Line #2 (Lake Murray #2) located in Fairfield, Richland, Lexington and Newberry Counties, South Carolina. Per the terms of the contract dated June 27, 2011 (VCS2-St. George Line 1&2 Comprehensive (06211-000), the data collected during the earlier VCS2-Lake Murray effort was combined with data collected during the literature review and survey of the proposed VCS2-St. George 230 kV Line #1 and #2 located in Dorchester, Orangeburg, Calhoun, Lexington, and Richland Counties, South Carolina. The combined literature review and survey data collected for both project areas is therefore covered in this comprehensive letter report. The research results outlined in this letter report provide information for planning purposes only and are not meant to serve as compliance with Section 106 of the National Historic Preservation Act or other state and/or federal legislation.

Once the transmission line pole locations are identified, a viewshed analysis of the associated structures will help in the development of a targeted visual Area of Potential Effect for any above-ground structures. A Section 106-compliant Phase I survey will then allow for full determinations of eligibility for those structures that lay within the lines' viewshed.

Literature Review, Architecture

We conducted a literature review for the VCS2-St. George 230 kV Line #1 and #2 Study Area to determine if any properties or sites had been recorded within the proposed project area. This research included a review of all previously recorded architectural resources located within the study area boundary on file at the South Carolina Department of Archives and History (SCDAH) in Columbia. The data, digitized on computer, include:

1. All aboveground resources recorded after 1989, including their NRHP eligibility;
2. All cultural resources studies conducted since 1989;
3. All archaeological sites, structures, and districts that are listed on the National Register of Historic Places (NRHP).

We also conducted a search of the SCDAH Finding Aid. The Finding Aid is an electronic document that lists all cultural resources projects that have occurred in a given county. We reviewed the document for studies that took place before 1990. There are a few pre-1990 aboveground resources surveys in the study area counties. However, the data contained in these

early studies were not collected using current survey methods and standards. Furthermore, the surveys are not comprehensive or reliable because the condition of many of the buildings surveyed likely has changed and many buildings not surveyed at that time because of age may now meet the minimum 50-year age requirement for survey. Structures recorded during these surveys were rarely assessed for NRHP eligibility and followed by a formal Determination of Eligibility (DOE) by the SCDAH. We did not include in the GIS database every structure surveyed prior to 1990. Structures and districts that were recorded prior to 1990 and that are listed on the NRHP would be included in our data.

When the VCS2-St. George 230 kV Line #1 and #2 Study Area is combined with the St. George #1-Lake Murray #2 Study Area, the comprehensive study area encompasses approximately 235 square miles within seven South Carolina counties (Richland, Fairfield, Newberry, Lexington, Calhoun, Orangeburg and Dorchester). According to Archsite, there are 145 previously recorded above-ground individual resources within the study area (data from Comp PR Architectural Resources and Comp NRHP Points). SCDAH classifies these resources as follows: 2 NRHP-listed properties, 9 properties determined NRHP-eligible, 3 properties determined potentially eligible, and 131 properties that have been determined not eligible. In addition to individual resources, Archsite reports that there are 17 multi-property or district resources within the comprehensive study area (data from Comp PR Architectural Polygons and Comp NRHP Polygons). SCDAH classifies these district resources as follows: 3 NRHP-listed resources, 5 resources determined NRHP eligible, 8 determined not eligible, and 1 not evaluated for NRHP eligibility. Where possible, NRHP-listed, eligible, or potentially eligible resources should be avoided and visual effects evaluated during project planning.

Table 1. Classifications of previously recorded individual architectural resources (GIS point data from shapefiles entitled Comp PR Architectural Resources and Comp NHRP Points)

Individual Resource Classifications	Count
NRHP-Listed	2
NRHP-Eligible	9
Potentially Eligible	3
Not Eligible	131
Total	**145**

Table 2. Classifications of previously recorded multi-property or district architectural resources (GIS polygon data from shapefiles entitled Comp PR Architectural Polygons and Comp NRHP Polygons)

District Resource Classifications	Count
NRHP-Listed	3
NRHP-Eligible	5
Potentially Eligible	0
Not Eligible	8
Not Evaluated	1
Total	**17**

Literature Review, Archaeology

We conducted our archaeological site search using Archsite, South Carolina's online cultural resources GIS database. The Archsite database provides information on cultural resources surveys as well as previously recorded archaeological sites. When the data from the St. George #1-Lake Murray #2 Study Area was combined with the data from the VCS2-St. George 230 kV Line #1 and #2 Study Area, 171 previously recorded archaeological sites fall within the comprehensive study area boundary. Of the 171 previously recorded sites, 4 were determined eligible for NRHP-listing, 23 (including 5 cemeteries) were determined potentially eligible for the NRHP or were recommended for further testing, 96 (including 1 cemetery) were determined not eligible or probably not eligible for the NRHP, and 48 (including 1 cemetery) have undetermined designations or have not been formally assessed. Sites determined eligible or potentially eligible for the NRHP should be avoided for physical impacts during project planning whenever possible. The non-eligible sites need no further consideration. Please note that cemeteries are afforded protection from direct disturbances by local ordinances and South Carolina state law.

Table 3. Classifications of previously recorded archaeological resources
(GIS polygon data from shapefile entitled Comp PR Archaeological Sites)

Archaeological Resource Classifications	Count
NRHP-Listed	0
NRHP-Eligible	4
Potentially Eligible/ Further Testing Recommended	23 (including 5 cemeteries)
Not Eligible/ Probably Not Eligible	96 (including 1 cemetery)
Undetermined/ Not Assessed	48 (including 1 cemetery)
Total	**171**

Windshield Reconnaissance

In April and May of 2011, the project historian conducted a windshield reconnaissance of the St. George #1-Lake Murray #2 Study Area. The windshield reconnaissance for the VCS2-St. George 230 kV Line #1 and #2 Study Area was completed in July and August 2011. As outlined in National Register Bulletin #24, a windshield reconnaissance-level survey is useful in ascertaining "a general picture of the distribution of different types and styles [of architectural resources], and of the character of different neighborhoods" (Parker 1985:35-36). Windshield surveys are also useful for making *preliminary* assessments of eligibility based on the architectural integrity of properties, but not in ascertaining the historical associations a property might possess.

The St. George #1-Lake Murray #2 Study Area begins at the VC Summer Nuclear Plant in Fairfield County and terminates at Lake Murray in Lexington County. The line also traverses through portions of Newberry, Richland and Lexington Counties on either side of I-26. Much of the study area was traditionally used for agriculture, which continues in some of the more remote areas. Much of the building stock in the area consists of mid-twentieth century middle income housing and late-twentieth century modular homes, with a heavy concentration of suburban

development servicing the west side of the City of Columbia. There is also substantial development along the Lake Murray shoreline. The Study Area is characterized by a variety of architectural types and styles and there is no one particular architectural theme or style.

The VCS2-St. George 230 kV Line #1 and #2 Study Area begins at Lake Murray in Lexington County and terminates in Dorchester County. The line also traverses through portions of Lexington, Richland, Calhoun, Orangeburg, and Dorchester Counties, roughly following the path of I-26 as it heads toward Charleston. The northern portion of the VCS2-St. George 230 kV Line #1 and #2 Study Area is very similar in character to the St. George #1-Lake Murray #2 Study Area in that the areas used traditionally for agriculture have experienced substantial suburban development. As the study area extends in a southeasterly direction towards Charleston, it becomes more rural and agricultural in nature. Some areas are very remote and roads are often unpaved. Exceptions to this rural development pattern occur near the City of Orangeburg, and near the towns of Bowman and St. George, which feature both mid- to late-20th century suburban development as well as areas of older historic resources. The VCS2-St. George 230 kV Line #1 and #2 Study Area is also characterized by a variety of architectural types and styles and there is no predominant architectural theme or style.

Both the St. George #1-Lake Murray #2 and the VCS2-St. George 230 kV Line #1 and #2 reconnaissance consisted of a vehicular inspection of architectural resources visible from all publicly accessible roads within the study areas. It is important to note that topographic and aerial maps often indicate properties located along private roads as well as abandoned and existing field roads. If a previously recorded property is found to be inaccessible, we reference current aerials to determine whether a building is extant. The purpose of our windshield reconnaissance was to:

1. Evaluate all previously recorded architectural resources (if any);
2. Locate architectural resources not previously recorded and that appear to meet the minimum fifty year age requirement for the NRHP, and
3. Identify potentially eligible NRHP properties.

The literature reviews for both St. George #1-Lake Murray #2 and VCS2-St. George 230 kV Line #1 and #2 identified a total of 162 previously recorded above–ground resources (individual resources and districts) in the approximately 235 square-mile comprehensive study area. These resources are indicated by both point data and polygons in the associated GIS data set (Comp PR Architectural Resources, Comp PR Architectural Polygons, Comp NRHP Points, and Comp NRHP Polygons). The SCDAH classifies these resources as follows: 5 NRHP-listed resources, 14 resources have been determined NHRP eligible, 3 properties (including 1 cemetery) that are potentially eligible for the NRHP, 1 resource that has not been evaluated for NRHP eligibility, and 139 resources (including 5 cemeteries) that have been determined not eligible by SCDAH. During the windshield survey, we determined that 13 of the 162 previously recorded above-ground resources have been destroyed or are not extant. The classifications of the non-extant resources are as follows: 3 determined NRHP eligible, 1 determined potentially eligible, and 9 determined not eligible. Of the 130 extant properties determined not to be eligible, our windshield survey considers 15 of the properties as potentially eligible resources. These evaluations are noted in the GIS data set. Whenever possible, it is recommended that NRHP

listed, NRHP-eligible or potentially eligible properties should be avoided and visual effects evaluated during project planning.

During the windshield reconnaissance, we also recorded an additional 33 resources (28 individual and 5 districts) that appear to retain sufficient architectural integrity to be considered eligible for inclusion in the NRHP. We observed numerous other properties that appear to be 50 years old (thus, meeting the minimal standard for NRHP eligibility consideration) distributed throughout the study area; these are properties that would be recorded by an architectural historian during a standard Section 106 survey. Due to significant alterations or modifications, these properties appear to have lost their architectural integrity and may not meet the criteria of eligibility for listing on the NRHP under Criterion C. However, these properties might possess historical significance which could only be determined through archival research such as would be required for a Section 106 cultural resources survey. We did not attempt to plot each of these resources in our GIS dataset. Where possible, those properties considered potentially eligible for the NRHP should be avoided and visual effects considered during project planning.

Table 4. Classifications of all architectural resources within study area reflecting evaluation of previously recorded resources and newly recorded resources documented during windshield survey (GIS point and polygon shapefiles entitled Comp PR Architectural Resources, Comp PR Architectural Polygons, Comp NRHP Points, and Comp NRHP Polygons)

Resource Classifications Reflecting Findings of Windshield Survey*	Count
NRHP-Listed	5
NRHP-Eligible	11
Potentially Eligible	50** (including 1 cemetery)
Not Eligible	115 (including 5 cemeteries)
Not Evaluated	1
Total	**182**

*Note: Previously recorded resources that are not extant have been accounted for in this table
**Note: Numerical Breakdown of 50 Potentially Eligible Resources:

- 2 previously recorded resources (including 1 cemetery) classified by SCDAH as potentially eligible
- 15 previously recorded resources classified by SCDAH as not eligible that have been evaluated by Brockington as potentially eligible during the windshield survey
- 33 newly recorded resources that Brockington evaluated as potentially eligible during the windshield survey

For the VCS2-St. George Line 1&2 Comprehensive project, we recommend that that a viewshed analysis be conducted once the locations of poles and any associated transmission line structures have been determined. A viewshed analysis would provide a targeted visual Area of Potential Effect for a Phase I architectural survey for full Section 106 compliance. A Phase I architectural survey would afford a more intensive structures analysis and the development of sufficient information to solicit eligibility determinations from SCDAH.

The index and detail maps (Figures 1-4) provided below detail the findings from both the comprehensive literature review and comprehensive windshield reconnaissance. The projection used to develop the map and shapefiles was NAD 1927 UTM Zone 17.

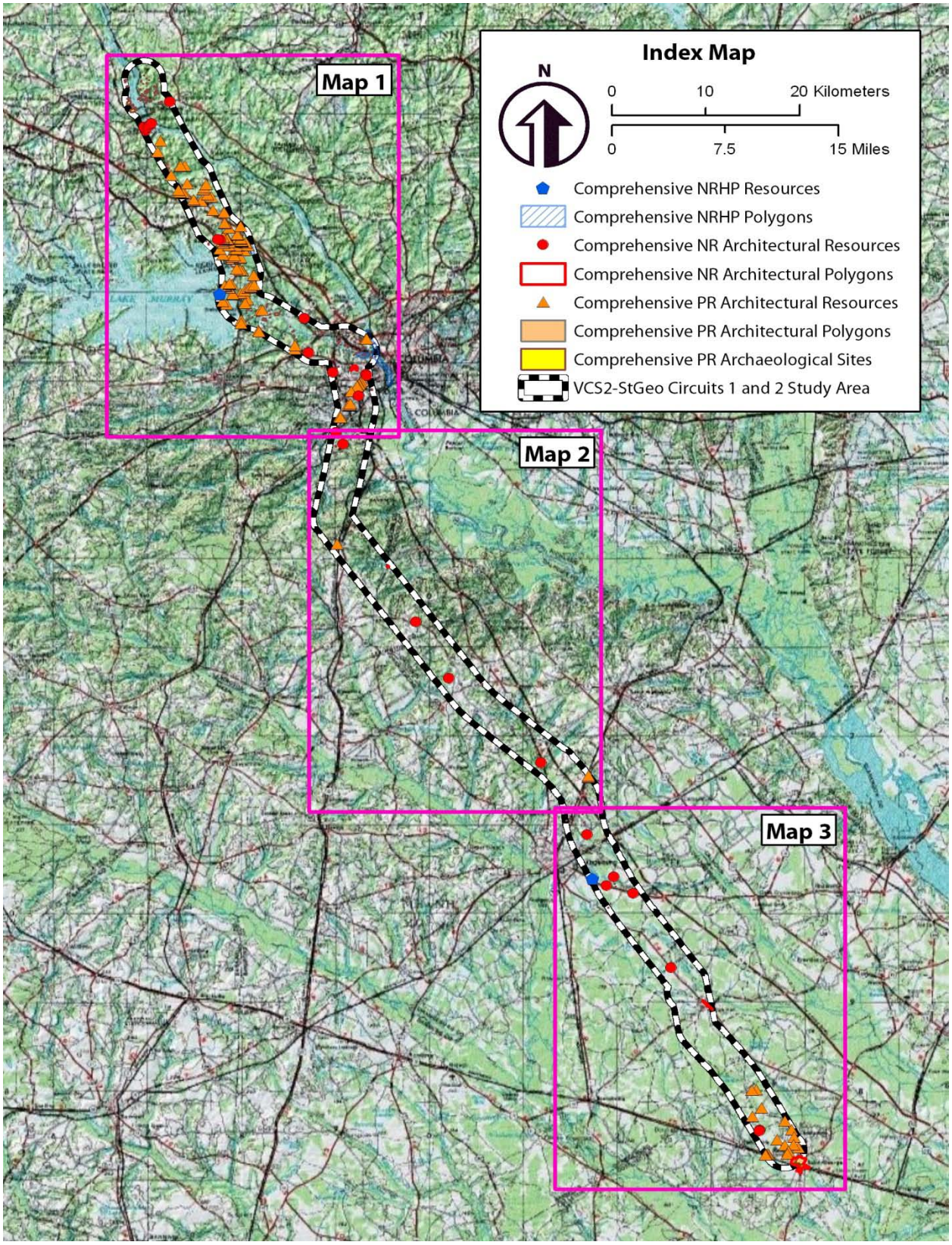
Should you have any questions regarding the GIS data or require any additional information on a particular property, please do not hesitate to send me an email (cameronsexton@brockington.org) or call (678) 638-4134.

With Best Regards,

Cameron D. Sexton, MHP
Historian and GIS Specialist

References

Parker, Patricia L.
1985 *Guidelines for Local Surveys: A Basis for Preservation Planning.* National Register Bulletin #24. National Park Service, Washington, D.C.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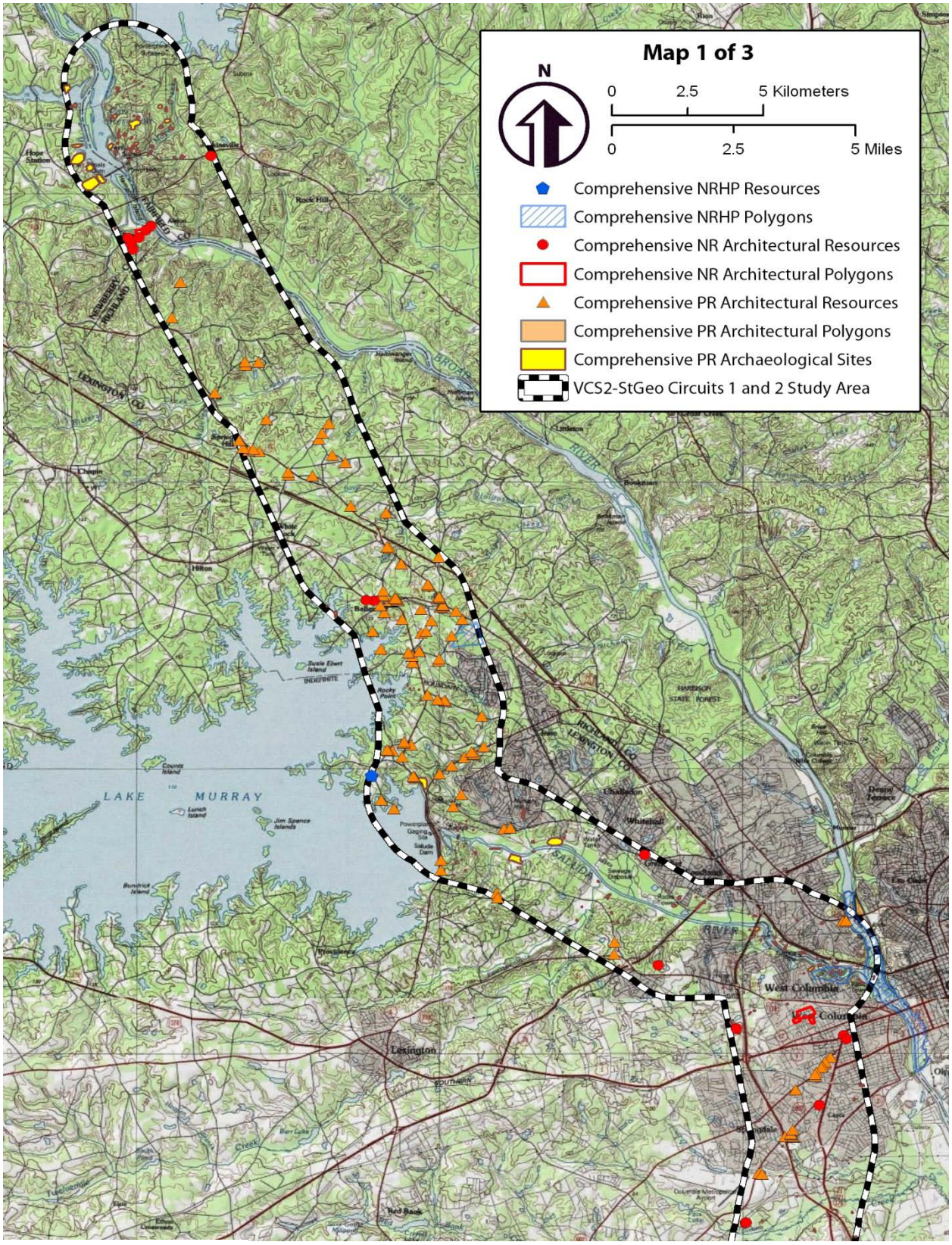
Comprehensive PR Architectural Resources
Comprehensive PR Architectural Polygons
Comprehensive PR Archaeological Sites
VCS2-StGeo Circuits 1 and 2 Study Area
Map 1
Map 2
Map 3

Figure1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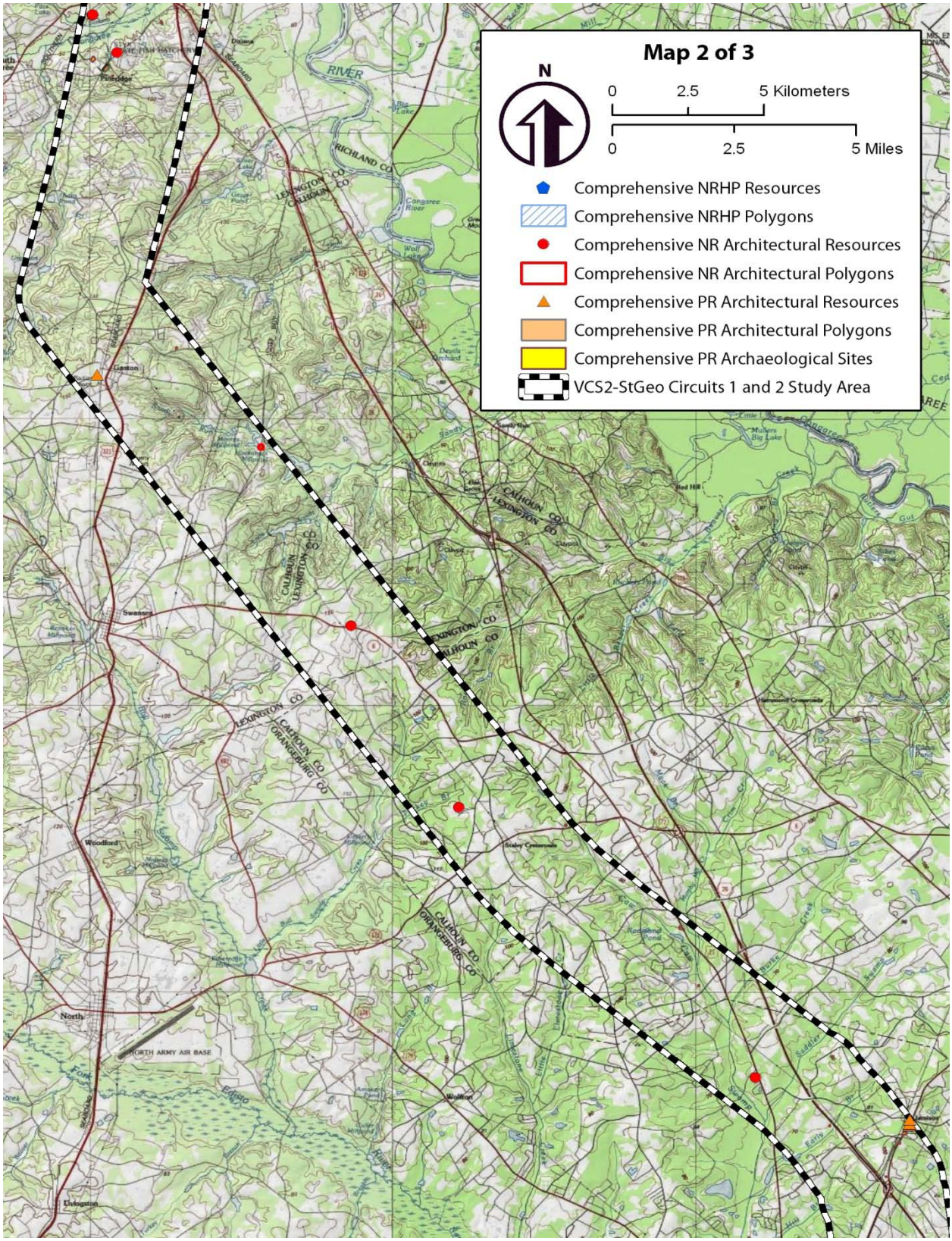
Comprehensive PR Architectural Resources
Comprehensive PR Architectural Polygons
Comprehensive PR Archaeological Sites
VCS2-StGeo Circuits 1 and 2 Study Area
LAKE
MURRAY
Lexington
West Columbia

Figure 2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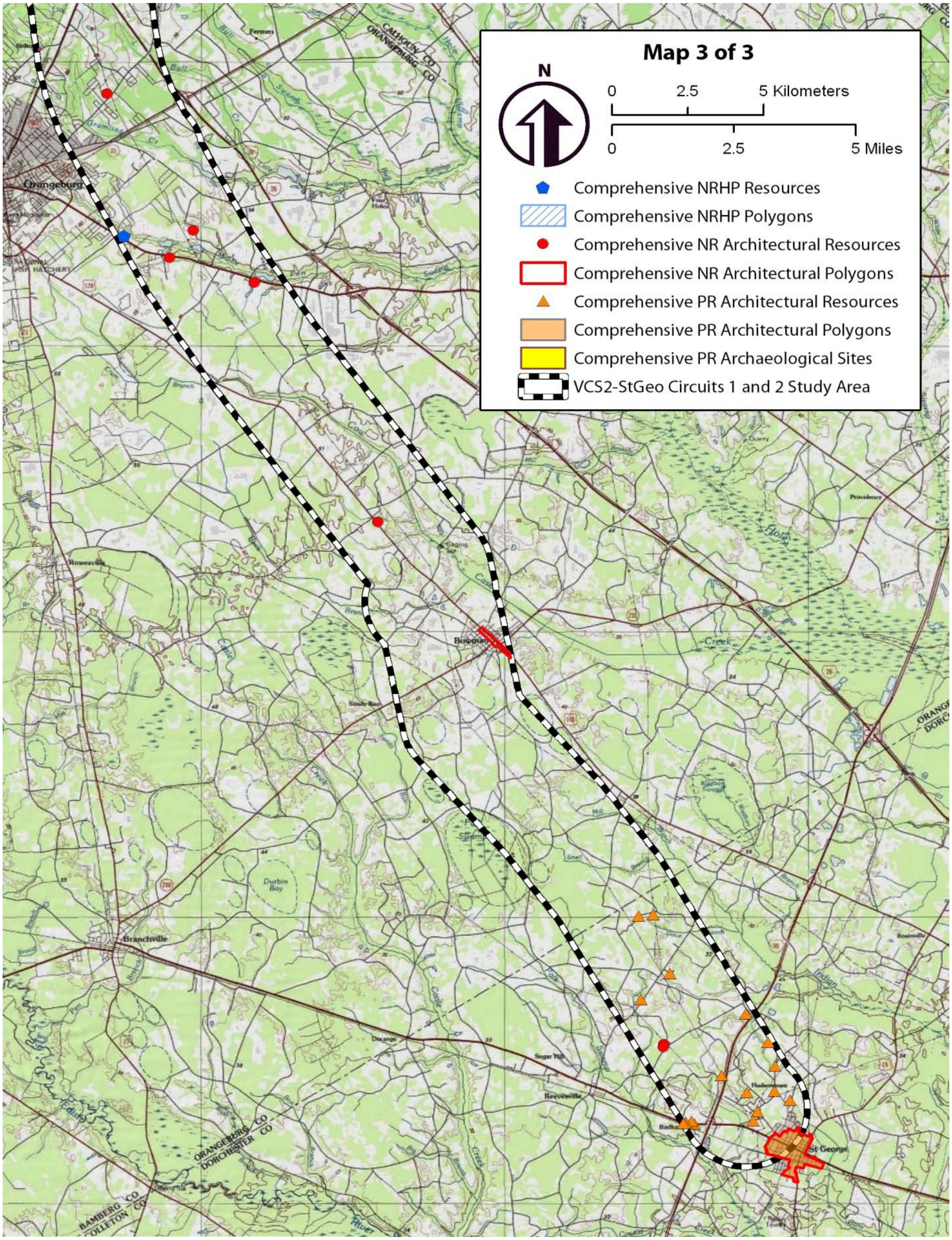
Comprehensive PR Architectural Polygons
Comprehensive PR Archaeological Sites
VCS2-StGeo Circuits 1 and 2 Study Area

Figure 3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Comprehensive NR Architectural Polygons
Comprehensive PR Architectural Resources
Comprehensive PR Architectural Polygons
Comprehensive PR Archaeological Sites
VCS2-StGeo Circuits 1 and 2 Study Area
Orangeburg
Branchville
Rowesville
St George

Figure 4

BIOLOGICAL ASSESSMENT FOR FEDERALLY PROTECTED SPECIES

TRANSMISSION LINES ASSOCIATED WITH V.C. SUMMER NUCLEAR STATION UNITS 2 AND 3

VARIOUS COUNTIES, SOUTH CAROLINA

Prepared for:

South Carolina Electric and Gas
2112 North Lake Drive
Columbia, South Carolina 29212

Prepared by:
Palmetto Environmental Consulting, Inc.
955 East Main Street, Suite E #52
Lexington, SC 29072

December 16, 2010

Introduction[1]

The proposed action is a joint project between South Carolina Electric & Gas Company (SCE&G) and the South Carolina Public Service Authority (Santee Cooper). The project consists of constructing two nuclear power units (Unit 2 and Unit 3) and their ancillary development to be jointly owned by SCE&G and Santee Cooper, and operated by SCE&G. Specifically, SCE&G proposes to build and operate two new Westinghouse AP1000 advanced light water reactors at the existing V.C. Summer Nuclear Station (VCSNS) site in Fairfield County, SC. The proposed project also consists of constructing approximately 396 corridor miles of new transmission lines, of which approximately 350.5 corridor miles will be located within existing transmission line rights-of-way (ROW). SCE&G will construct approximately 157 corridor miles of transmission lines, with approximately 151 miles being within existing ROW. Santee Cooper will construct approximately 239 linear miles of transmission lines, with approximately 199.5 miles being within existing ROW.

SCE&G is the principal subsidiary of SCANA Corporation, an energy-based holding company with headquarters in Cayce, South Carolina. Santee Cooper is South Carolina's state-owned electric and water utility, with corporate headquarters in Moncks Corner, South Carolina. SCE&G has been authorized by Santee Cooper to act as their agent in applying for a Section 404 permit for the proposed project. Because of the Federal nexus of applying for a license from the Nuclear Regulatory Commission (NRC) and a Section 404 permit, consultation with the United States Fish and Wildlife Service (USFWS) is required under Section 7 of the Endangered Species Act (ESA) of 1973, as amended.

Project Description

The VCSNS site is located in Fairfield County, South Carolina, approximately 15 miles west of Winnsboro and 26 miles northwest of Columbia. The site is in a sparsely populated, largely rural area, with forests and small farms comprising the dominant land use. The Broad River flows in a northwest-to-southeast direction approximately one (1) mile west of the site and serves as the boundary between Fairfield County (to the east) and Newberry County (to the west). The new plant footprint is located south of VCSNS Unit 1 (the existing facility) and is generally the area that was used for laydown of construction materials and the source of borrow material during the construction of Unit 1. This Biological Assessment (BA) does not address the VCSNS site, as several protected species surveys were conducted between 2002 and 2007 for the nuclear site and are addressed in the Environmental Impact Statement (EIS) prepared by the NRC.

SCE&G will construct four (4) new transmission lines primarily within existing cleared transmission line ROW. These lines will extend from both the existing Unit 1 switchyard (VCS1) and the proposed Unit 2 and 3 switchyard (VCS2) at the VCSNS site to other locations within the state: 1) VCS1-Killian 230kV Line – ties to SCE&G's existing Killian substation, located approximately 1.5 miles south of the intersection of SC Highway 555 and Killian Road in Richland County, SC; 2) VCS2-Lake Murray 230kV Line #2 – ties to SCE&G's existing Lake Murray 230kV substation, adjacent to Saluda Hydro and McMeekin generating stations; 3) VCS2-St. George 230kV Line #1; and 4) VCS2-St. George 230kV Line #2. Lines 3) and 4) will run in separate, existing SCE&G ROW corridors to a location (owned by SCE&G) near SCE&G's existing Lake Murray 230kV substation. These two lines will not tie to the Lake Murray substation, but will converge here and from this point run a common, existing SCE&G ROW corridor until they

[1] Portions of first paragraph are taken from SCE&G Combined Operating License Application (COLA) Part 3-Environmental Report, Revision 1.

reach SCE&G-owned property in St. George, SC, where the future St. George 230kV substation will be constructed. This future substation will be located approximately one mile east of the intersection of Interstate 95 and US Highway 78 in Dorchester County, SC (Figure 1, Appendix A).

Minimal environmental impacts are anticipated from construction of the proposed transmission lines. Of the approximately 157 miles of SCE&G transmission lines that compose this project, approximately 151 miles, or 96%, are located in existing SCE&G transmission line ROW. The remaining approximately six (6) miles (4%) of line will be constructed within new ROW. SCE&G will implement appropriate Best Management Practices (BMPs) during construction which will minimize adverse effects from transmission line construction.

At the request of SCE&G, Palmetto Environmental Consulting, Inc. (PEC), Dr. L.L. Gaddy, and Mr. J. Robert Siler conducted surveys for federally-listed threatened and endangered plant and animal species within corridors containing or proposed to contain transmission lines associated with the proposed Units 2 and 3 project.

Species Descriptions

Shortnose Sturgeon

As shown in Table 1, the shortnose sturgeon is listed by the USFWS for Calhoun, Dorchester, Lexington, Orangeburg, and Richland counties. This species lives mainly in slower moving riverine waters or nearshore marine waters, migrating periodically into faster moving fresh water areas to spawn (Office of Protected Resources 2004). Adults have separate summer and winter areas. No historical or current population dynamics are known for this species (NMFS/NOAA 2010).

Frosted Flatwoods Salamander

The frosted flatwoods salamander is located east of the Appalachicola River Basin. The species occurs in isolated populations scattered across the lower southeastern Coastal Plain in Florida, Georgia, and South Carolina (USFWS 1999, USFWS 2009). There are four known populations of frosted flatwoods salamander in South Carolina, and of the counties through which the transmission lines will be located, the USFWS lists this species as occurring only in Orangeburg County. The species inhabits moist soil of longleaf pine (*Pinus palustris*) and slash pine (*P. elliottii*) flatwoods of the southeastern coastal plain. However, not all flatwoods are appropriate habitat, as the species only occurs at sites with seasonal ponds and flatwoods which are usually fire-maintained. Critical habitat has been designated for the frosted flatwoods salamander in Berkeley, Charleston, and Jasper counties, SC (USFWS 2009); however, none of SCE&G's proposed transmission line corridors are located in these counties.

The frosted flatwoods salamander is a slender, small-headed mole salamander. Adult dorsal color ranges from dark black to chocolate black with grayish or silvery network pattern or frosted appearance running along the lateral and dorsal surfaces. Typical breeding sites are isolated wetland depressions, which dry completely on a cyclic basis, thus eliminating fish species. The depressional wetlands are generally dominated by pond cypress (*Taxodium ascendens*) and swamp tupelo (*Nyssa biflora*). The groundcover is typically made up of clumps of sedges and grasses and other herbaceous species. Growing season fires through the breeding ponds are thought to improve breeding habitat for this species.

Smooth Coneflower

Smooth coneflower is historically a plant of prairie-like habitats or oak-savannas maintained by natural or Native American-set fires. Currently, the species primarily occurs in openings in woods, such as cedar barrens, clear cuts, along roadsides, utility line rights-of-way, and on dry limestone bluffs. The coneflower is found on clay soils especially rich in magnesium and calcium (high pH) and is generally associated with Iredell, Mecklenberg, and Brevard Belt soils in the Carolinas and Georgia. The plant does not compete well in densely-shaded forest conditions and prefers open woods and prairie-like environments (Gaddy and Siler 2010).

Bald Eagle

The bald eagle is primarily riparian, associated with rivers, coasts, and lakes, usually nesting near bodies of water where it feeds. Selection of nesting sites varies depending on the species of trees growing in a particular area, but in the Southeast, nests are constructed in dominant or codominant pines or cypress (USFWS 1996a). Many nests are used annually. In South Carolina, bald eagles typically nest from October 1 through May 15. Prior to the species being protected under the ESA, South Carolina had only 13 pairs of bald eagles.

While the bald eagle is no longer listed as federally threatened or endangered, it is still protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Under BGEPA, the National Bald Eagle Management Guidelines (USFWS 2007) protect habitat for the species although the protective buffers are smaller than the earlier requirements under the ESA.

Carolina Heelsplitter

The Carolina heelsplitter, a freshwater mussel, can reach up to 4.6 inches in length, 1.6 inches in width, and 2.7 inches in height. Specific aspects of the species life history are unknown (USFWS 2002). The Carolina heelsplitter is usually found in mud, muddy sand, or muddy gravel substrates along stable, well-shaded stream banks. The species has also been found in Mountain Creek (Edgefield County, SC) in a relatively silt-free substrate comprised primarily of a mixture of sand, gravel, and cobble (USFWS 2005). Personal communication with USFWS also revealed that only perennial streams support this species. In South Carolina, the four surviving heelsplitter populations are limited to the Catawba, Pee Dee, and Savannah River systems (USFWS 2005). There are no known records from the Broad River system although surveys were conducted from 1987-1990 (USFWS 1993a).

Pondberry

Pondberry is a dioecious, deciduous shrub with pale yellow flowers. The fruit is a bright red drupe that matures in the fall. Flowering occurs late in February to mid-March; fruiting occurs from August to early October. The leaves have a strong, sassafras-like odor when crushed. Reproduction seems to be primarily vegetative by means of stolons (USFWS 1992).

Pondberry is generally associated with wetland habitats and the margins of sinks, ponds, and other depressions in the more coastal sites. The plants generally grow in shaded areas but may also be found in full sun (USFWS 1991a). However, it does not appear to tolerate dense shade and is absent where shrubs are dense in wetland margins (Gaddy and Siler 2010).

Rough-leaved Loosestrife

Rough-leaved loosestrife is a perennial rhizomatous herb about 10-20 inches tall with yellow

flowers in a raceme (USFWS 1995). Leaves are sessile and in whorls of three to four. The species flowering from late May to early June; seeds form by August but capsules do not dehisce until October (USFWS 1995).

This species usually occurs in the ecotones between longleaf pine uplands and pond pine pocosins, on moist to seasonally saturated sands and on shallow organic soils overlaying sand. It has also been found on deep peat in the low shrub community of large Carolina bays. The grass-shrub ecotone, where loosestrife is found, is fire-maintained, as are the adjacent plant communities (USFWS 1995).

Wood Stork

Wood storks are large, long-legged wading birds. They are white except for black primaries and secondaries and a short black tail. The head and neck are largely unfeathered and dark gray in color. The bill is black, thick at the base, and slightly decurved (USFWS 1992). Wood storks typically nest in cypress/tupelo gum ponds with standing water. It is a highly colonial species usually nesting in large rookeries and feeding in flocks.

Wood storks are generally associated with freshwater and brackish wetlands, mainly nesting in cypress or mangrove swamps. Feeding habitat consists of narrow tidal creeks, flooded tidal pools, or freshwater marshes. Good feeding sites consist of depressions in marshes or swamps where fish may become concentrated during falling water levels (USFWS 1996b).

Canby's Dropwort

Canby's dropwort is a perennial herb with erect, hollow stems, aromatic foliage and elongate, stoloniferous rhizomes. It has minute white flowers produced in terminal or axillary umbels; sepals may be tinged red. The fruit is a strongly-winged schizocarp. The species flowers from late May through early August and fruits in early fall.

Canby's dropwort grows in coastal plain habitats including wet pineland savannas, wet meadows, sloughs, ditches, and around the edges of cypress-pine ponds. Thriving populations seem to occur in open bays or ponds which are wet most of the year and have little or no canopy cover. Ideal soils for the species have a medium to high organic content and a high water table (USFWS 1991b).

Red-cockaded Woodpecker (RCW)

Nesting habitat for RCWs consists of open stands of pine with a minimum age of 80 to 120 years, depending on the site. Longleaf pines are most commonly used for nesting, but other species of southern pine may also be used. Dense stands which contain primarily hardwoods or have a dense hardwood understory are avoided. RCW foraging habitat is characterized by pine and pine hardwood stands 30 years old or older with foraging preference for pines 10 inches or larger in diameter (USFWS 1993b).

RCWs are unique in that they excavate cavities for roosting and nesting in living pines, and use living pines almost exclusively for foraging substrate, preferring longleaf pine when available. RCWs require open pine woodlands and savannahs with large old pines for nesting and roosting habitat (i.e., cavity trees) (USFWS 2003). Cavity trees must be in open pine stands with little or no hardwood midstory and few or no overstory hardwoods. Hardwood encroachment resulting from fire suppression is a well-known cause of cluster abandonment. RCWs also require

abundant foraging habitat. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, and few or no overstory hardwoods (USFWS 2003).

For purposes of surveying, suitable nesting habitat consists of pine, pine/hardwood, and hardwood/pine stands that contain pines 60 years in age or older and that are within 0.5 mile of suitable foraging habitat; suitable foraging habitat consists of a pine or pine/hardwood stand in which 50 percent or more of the dominant trees are pines and the dominant pine trees are generally 30 years in age or older (USFWS 2003).

Methodology

Prior to beginning field surveys, USFWS and the South Carolina Department of Natural Resources (SCDNR) were contacted to obtain the most current known federally-protected species occurrence information. USFWS provided a GIS layer containing such information (which also generally reflects occurrences included in the SCDNR database), which was overlaid with maps depicting the proposed transmission line corridors. The USFWS layer was cross-referenced with SCDNR's "South Carolina Rare, Threatened and Endangered Species Inventory" database to ensure complete coverage of known protected species occurrences. The USFWS's "South Carolina List of Endangered, Threatened and Candidate Species, July 2010" was used to determine for which species surveys would be conducted for each county that the proposed transmission lines are located. According to agency records and at the time field investigations began, no federally-listed threatened and endangered species were known to occur within or along the margins of any of the transmission corridors in the study area. Sheets 1 through 5 (Appendix B) show all known federally-listed threatened or endangered species occurrences located within two miles of the transmission corridors. The known occurrences are limited to ten occurrences of bald eagle.

Field personnel noted all habitats types that were located within the transmission line corridors and within the vicinity of the corridors using remote sources. The habitat maps were compiled using natural color and infrared imagery of the study area with topographic, soil, and wetland features overlaid on the natural color and infrared imagery.

Potential habitats for all of the potentially-occurring federally-listed species were then plotted on study area mapping before fieldwork began. Field investigations were conducted in those areas where apparent appropriate habitat was contained within or along the margins of the transmission line corridors (Gaddy and Siler, 2010). Eighty-seven (87) field sites containing potential habitat were field investigated, which can be seen on Sheets 1 through 5 (Appendix B). Surveys for the species listed in Table 1 were conducted between October 19 and November 10, 2010. These surveys were conducted at sites where protected species could potentially occur.

Habitat Descriptions

The VCS1-Killian 230 kV line is located almost entirely in the Piedmont province. The extreme southern portion of the Killian Line extends into the Upper Coastal Plain region of Richland County. All of the approximately six (6) miles of proposed new ROW associated with this project is located on the VCS1-Killian line.

The northernmost portion of the VCS2-St. George #1/VCS2-Lake Murray #2 and VCS2-St. George #2 230 kV lines are located in the Piedmont province in Fairfield, Newberry, Richland, and

Lexington counties. From northern Lexington County southward, the St. George lines are located within the Upper and Middle Coastal regions associated with Aiken, Calhoun, Orangeburg, Bamberg, and Dorchester counties. Very short segments of the St. George lines are located within the Lower Coastal Plain region associated with Dorchester and Colleton counties. The majority of the St. George lines are located on existing, cleared ROW. A portion of the existing corridor on which the VCS2-St. George #1/VCS2-Lake Murray #2 line will be constructed in Newberry and Fairfield counties currently contains an existing electric distribution line. The distribution line corridor will be cleared to SCE&G's existing ROW limits to accommodate the proposed transmission line.

The route of the VCS2-Lake Murray #2 230 kV Line is entirely within the Piedmont province of southwestern Fairfield County, northwest Richland County, and northern Lexington County. The VCS2-Lake Murray #2 line is located primarily on existing, cleared ROW.

All of the approximately six (6) miles of proposed new ROW associated with this project is located on the VCS1-Killian line.

Maintained Transmission Line ROW

Approximately 95% of the SCE&G proposed transmission lines consist of maintained cleared ROW where vegetation is controlled to avoid impacting overhead utility lines. These easements are mechanically and/or chemically maintained which results in early successional communities including perennial herbaceous and shrubby vegetation. Land cover types occurring along the existing corridors are the result of vegetation management by the utility provider or landowner.

The majority of the cleared ROW consists of uplands with well drained, sandy soils and includes species in the herbaceous layer such as broom sedge (*Andropogon virginicus*), morning glory (*Opomoea purpurea*), dog fennel (*Eupatorium* spp.), ragweed (*Ambrosia artemisiifolia*), panic grass (*Panicum* spp.), partridge pea (*Cassia occidentalis*), blackberry (*Rubus* spp.), goldenrod (*Solidago* sp.), Johnson grass (*Sorghum halepense*), baccharis (*Baccharis halimifolia*), bahiagrass (*Paspalum notatum*), and thistle (*Circium* sp.).

There are also areas where the maintained, existing ROW is located in low lying, poorly drained soils that includes floodplains, depression wetlands, beaver-impounded wetlands, or seep wetlands. These areas contain species including wool grass (*Scirpus cyperinus*), smartweed (*Polygonum* spp.), cinnamon fern (*Osmunda cinnamomea*), cattail (*Typha latifolia*), netted chain fern (*Woodwardia areolata*), plumegrass (*Saccharum giganteum*), red maple (*Acer rubrum*), black willow (*Salix nigra*), blackberry, giant cane (*Arundinaria gigantea*), and soft rush (*Juncus effusus*).

Oak-hickory Forest

Oak-hickory forest is found throughout the state but is most characteristic of rolling uplands in the Piedmont. Occurring in highly fragmented stands, later successional stages tend to be made up of a diverse assemblage of hardwoods, primarily oaks and hickories, as co-dominants in combination with pines. Understory, shrub and herbaceous layers are present in varying degrees, represented by diverse woody and non-woody species. Vegetation on most sites consists of early- to mid-successional managed stands of pine and pine-hardwood forest. The understory in pure pine stands is often open, but in mixed or older stands, it is dominated by the hardwoods characteristic of the site. Common pine species of the Piedmont include shortleaf (*P. echinata*) and loblolly (*P. taeda*), with the former better adapted to dry, fine textured upland soils and

loblolly achieving maximum growth on deep soils with good moisture and drainage (Facilities Planning & Siting, PLLC, 2008).

Grassland and Early Successional Habitats

A variety of open habitats occupies a considerable portion of upland sites in the Piedmont, including agricultural land, recently abandoned farmland, recently cleared land, and a matrix of managed open pine forest and grassland. Urban and rural yards and open spaces are also included in this habitat type. The vegetation on most sites is oak-hickory forest, although many sites are maintained in early successional stages (Facilities Planning & Siting, PLLC, 2008).

Pine/Hardwood Forest

This classification is used to describe all pine forests throughout the Piedmont and Upper Plain region, including those occupying a variety of soil moisture characteristics except floodplains. The canopy is dominated by one or several species of pine, generally loblolly pine, or longleaf, depending on elevation, soil type and silvicultural history. Dense shrub thickets of hollies (*Ilex* spp.) and wax myrtle (*Morella cerifera*) may be present. A mixture of pine and hardwoods is also common in these ecosystems; common hardwood species consist of water oak, sweet gum, hickory, inkberry (*I. opaca*), and Eastern red-cedar (*Juniperus virginiana*). Higher elevation pine woodlands have abundant grasses and herbaceous cover, particularly when burning is frequent.

Bottomland/Floodplain Forest: This wetland classification is found in deciduous forests adjacent to stream systems that are crossed by the proposed segments of new ROW. Dominant species in these ecosystems have the ability to survive in areas that are either seasonally flooded or covered with water much of the year.

Canopy and shrub species include yellow poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), loblolly pine, sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), swamp tupelo, water oak (*Quercus nigra*), fetterbush (*Lyonia lucida*), inkberry, and sweet gum (*Liquidambar styraciflua*). Dominant species associated with the understory include woolgrass, cinnamon fern, netted chain fern, laurel greenbrier (*Smilax laurifolia*), and jewelweed (*Impatiens capensis*).

Environmental Baseline

Shortnose Sturgeon

Regarding the proposed project, the only waterbodies crossed by the proposed transmission lines that meets the sturgeon's habitat requirement is the Broad River and the Saluda River. However, the USFWS data layer reflects no known occurrences of this species in either river, and therefore, none near the proposed transmission line corridors.

Frosted Flatwoods Salamander

The only areas investigated for this species in the county for which it is listed by USFWS as occurring (Orangeburg County) consisted of small portions of two gum ponds within the existing transmission line ROW. These two gum ponds, being within an existing maintained transmission line ROW, did not contain habitat typically associated with the species (i.e., no adjacent pine flatwoods). No other appropriate habitat for this species exists within the study corridors.

Smooth Coneflower

In all, ten field sites (five Orange, three Mecklenberg, and two Enon soils sites) within the

transmission corridors were visited. Several species known to be associated with dry, high pH soils and smooth coneflower such as Indian grass (*Sorghastrum nutans*), false indigo (*Baptisia cinerea*), and little blue stem (*Schizachyrium scoparium*) were found at these sites, but no smooth coneflower stems or basal leaves were seen during the fieldwork (Gaddy and Siler 2010).

Bald Eagle

Transmission line corridors located within two miles of rivers or large bodies of water were surveyed for bald eagles. No bald eagle nests were observed within or along the fringes of the proposed transmission line corridors, and the USFWS data layer reflects no known occurrences within a one-half mile radius of the proposed project corridors.

There are two known bald eagle nests approximately 1,000 feet from the proposed transmission lines. SCE&G is aware of one recently constructed bald eagle nest that is not reflected on either USFWS's or SCDNR's databases. The nest is located approximately 1,000 feet north of the VCS1-Killian 230kV transmission line corridor, just south of the V.C. Summer Nuclear Station Unit 1's outfall structure on Monticello Reservoir. A second known bald eagle nest is located approximately one mile downstream of the Dreher Shoals Dam on the north bank of the Saluda River. The proposed VCS2-St. George #1 and #2 transmission lines approach no closer than approximately 1,000 feet north of this known nest.

An issue associated with large raptors is their vulnerability to power line electrocution. Their large size, wingspan, and perching make them susceptible to electrocution on certain transmission line designs. Transmission line structures with inadequate spacing between phases (i.e., less than 60 inches of separation between conductors and/or grounded hardware) can cause raptor electrocutions. With this in mind, the USFWS has recommended, under authority of the MBTA and BGEPA, that all new transmission structures be equipped with design features that prevent these electrocutions. Such features typically include designs that (1) make the distance between phase conductors greater than the wingspread of the bird that is landing, perching, or taking off; and (2) increase the distance between grounded hardware (e.g., ground-wires) and an energized conductor to more than the largest bird's wingspread or the distance from the tip of the bill to the tip of the tail. The 230 kV structures that will be used on the VCS1-Killian, VCS2-St. George #1 and #2, and VCS2-Lake Murray #2 230 kV Lines will be "raptor safe" and meet the guidelines recommended in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (Avian Power Line Interaction Committee 2006); therefore, raptor electrocutions are not anticipated on this project (Facilities Planning & Siting, PLLC, 2008).

Carolina Heelsplitter

Only a short segment of the VCS1-Killian transmission line corridor is located within the Catawba River (Wateree River) basin **and** is located in Fairfield County, the only county the proposed transmission line corridors are located in which the heelsplitter is listed by the USFWS. There are only four perennial stream segments within the Catawba basin which intersect the transmission line corridors. These segments were visually assessed, but no mussels were observed.

Pondberry

Pondberry was not seen during field examination of twenty (20) wetland sites on the VCS2-St. George #1 and #2 transmission corridors and environs. Furthermore, no good habitat for the plant appeared to occur within or along the transmission corridor (Gaddy and Siler 2010).

Rough-leaved Loosestrife

Twenty-six (26) sites were assessed for the presence of rough-leaved loosestrife. Because of the lack of fire and the density of the herbaceous vegetation layer at these sites, no habitat for rough-leaved loosestrife was present (Gaddy and Siler 2010).

Wood Stork

No wood storks or rookeries were observed during fieldwork in Orangeburg County, the only county through which the proposed transmission lines will be located that USFWS has listed as containing wood stork. However, it is feasible that the species may forage in wetlands located within the proposed transmission line corridors.

Canby's Dropwort

Twenty (20) wetland depressions on the VCS2-St. George #1 and #2 corridors were field-checked in early November of 2010. Most of these wetlands were too dry for Canby's dropwort (they had been previously drained for agricultural purposes) or did not harbor pond cypress. Four (4) of these depressions were wet; three (3) were either too wet or too dense to support Canby's dropwort. The fourth contained potential habitat, and was therefore, surveyed for the species. None were found.

Red-cockaded Woodpecker (RCW)

A few stands of potential foraging habitat existed adjacent to the proposed transmission line corridors in counties for which the species is listed as occurring. However, there are no known occurrences of RCWs within two miles of the proposed corridors and no birds were observed during field work.

Determination of Effect

SCE&G's portion of the proposed project will consist of constructing approximately 157 corridor miles of new transmission lines, approximately 151 miles of which will be within existing ROW. The remaining approximately six (6) miles of transmission lines will be constructed on new ROW, an area consisting of approximately 78.6 acres. SCE&G will implement appropriate BMPs during construction which will result in minimizing adverse effects from transmission line construction.

Literature and record searches have been conducted to determine if known occurrences of federally-listed threatened and endangered species occur within SCE&G's proposed transmission line corridors. Based on those searches, field investigations, and the proposed construction plans including implementing BMPs, it has been determined that the proposed project: 1) is not likely to disturb the bald eagle; 2) will have no effect on the shortnose sturgeon and rough-leaved loosestrife; and 2) may affect, but is not likely to adversely affect, the frosted flatwoods salamander, smooth coneflower, Carolina heelsplitter, pondberry, wood stork, Canby's dropwort, and red-cockaded woodpecker.

Table 2 presents those federally-listed threatened and endangered species which were considered for the proposed project, with a determination of effect and justification of each determination.

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Table 1. Federally-Listed Threatened and Endangered Species Considered for the Proposed Project **(Source: Gaddy and Siler 2010)**

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	CALHOUN	DORCHESTER	FAIRFIELD	LEXINGTON	NEWBERRY	ORANGEBURG	RICHLAND	HABITAT
Acipenser brevirostrum	Shortnose Sturgeon	E	X	X		X		X	X	Large rivers with shoals
Ambystoma cingulatum	Frosted Flatwoods Salamander	T						X		Wet pine flatwoods, isolated wetlands
Echinacea laevigata	Smooth Coneflower	E				X			X	Calcium- & magnesium rich clays in open woods
Haliaeetus leucocephalus	Bald Eagle	BGEPA	X	X	X	X	X	X	X	Large rivers & lakes
Lasmigona decorata	Carolina Heelsplitter	E			X					Small streams
Lindera melissifolia	Pondberry	E		X						Isolated wetlands & their margins
Lysimachia asperulifolia	Rough-leaved Loosestrife	E							X	Fire maintained acidic bogs in the Sandhills
Mycteria americana	Wood Stork	E						X		Cypress-tupelo & other wetlands
Oxypolis canbyi	Canby's dropwort	E		X				X	X	Pond cypress savannahs
Picoides borealis	Red-cockaded Woodpecker	E	X	X		X		X	X	Open, mature, fire-maintained pine woods

Table 2. Determinations of Effect for Federally-Listed Threatened and Endangered Species Considered for the Proposed Project

Species	Determination of Effect	Justification
Shortnose Sturgeon	No effect	No crossings of large river systems
Frosted Flatwoods Salamander	May affect, not likely to adversely affect	Potential habitat found to be unsuitable due to adjacent land use
Smooth Coneflower	May affect, not likely to adversely affect	Potential habitat locations revealed no presence of the species
Bald Eagle	Not likely to disturb	Impacts will be approximately 1,000 feet from known nest locations
Carolina Heelsplitter	May affect, not likely to adversely affect	BMPs will minimize adverse effects to stream systems
Pondberry	May affect, not likely to adversely affect	No good habitat was observed, and no stems were found
Rough-leaved Loosestrife	No effect	No appropriate habitat present
Wood Stork	May affect, not likely to adversely affect	No nesting occurrences observed
Canby's dropwort	May affect, not likely to adversely affect	One appropriate habitat searched, but no stems present
Red-cockaded Woodpecker	May affect, not likely to adversely affect	No suitable nesting habitat to be impacted and none adjacent; fragmented foraging habitat not located near nesting habitat

Appendix A. Inventory of Federally-Listed Endangered and Threatened Species within SCE&G Transmission Line Corridors Associated with the V.C. Summer Nuclear Station Units 2 and 3 Project, prepared by L. L. Gaddy, terra incognita, and J. Robert Siler, Environmental Resources of the Carolinas, November 2010

INVENTORY OF FEDERALLY-LISTED ENDANGERED AND THREATENED SPECIES WITHIN SCE&G TRANSMISSION LINE CORRIDORS ASSOCIATED WITH THE V. C. SUMMER NUCLEAR STATION UNITS 2 AND 3 PROJECT

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Charlotte, North Carolina

on behalf of
SOUTH CAROLINA ELECTRIC & GAS COMPANY

November 2010

INTRODUCTION

This report presents the findings of an inventory of federally-listed endangered and threatened species on transmission corridors associated with South Carolina Electric and Gas's V. C. Summer Project. The transmission corridors or "study area" for this investigation included the VCS1-Killian (existing and new), the VCS2-Lake Murray #2, the VCS2-St. George #1 and VCS2-St. George #2 (see Map 1).

METHODOLOGY

A literature and internet review of the federally-listed species potentially-occurring in the study areas for electric power transmission lines associated with the V. C. Summer Project was conducted in October and early November of 2010. Ten federally-listed species are known from the counties through which the transmission lines pass. Table 1 summarizes the status, geography, and ecology of these species. The potentially-occurring species include the Shortnose Sturgeon (*Acipenser brevirostrum*)(endangered), the Bald Eagle (*Haliaeetus leucocephalus*)(threatened), the Red-cockaded Woodpecker (*Picoides borealis*)(endangered), the Wood Stork (*Mycteria americana*)(endangered), the Frosted Flatwoods Salamander (*Ambystoma cingulatum*)(threatened), the Carolina Heelsplitter (*Lasmigona decorata*)(endangered), the smooth coneflower (*Echinacea laevigata*)(endangered), Canby's dropwort (*Oxypolis canbyi*)(endangered), rough-leaved loosestrife (*Lysimachia asperulifolia*)(endangered), and pondberry or southern spicebush (*Lindera melissifolia*)(endangered).

As may be seen in Table 1, habitats of occurrence vary significantly from species to species. The Shortnose Sturgeon is an anadromous species of fish that breeds in the rocky shoals of large rivers. The Bald Eagle nests along or near major rivers and lakes. The Red-cockaded Woodpecker prefers open, mature burned pine woods in the Coastal Plain (Russo and Sweeney, 2000). The Wood Stork nests in cypress-tupelo swamp forests in the Coastal Plain (Murphy, 1995). The Frosted Flatwoods Salamander occurs in wet pine flatwoods and in isolated wetlands bordered by pine flatwoods (U.S. Fish and Wildlife Service, 2010c). The Carolina Heelsplitter is a mollusk found in small rivers and their tributaries (Russo and Sweeney, 2000). Smooth coneflower

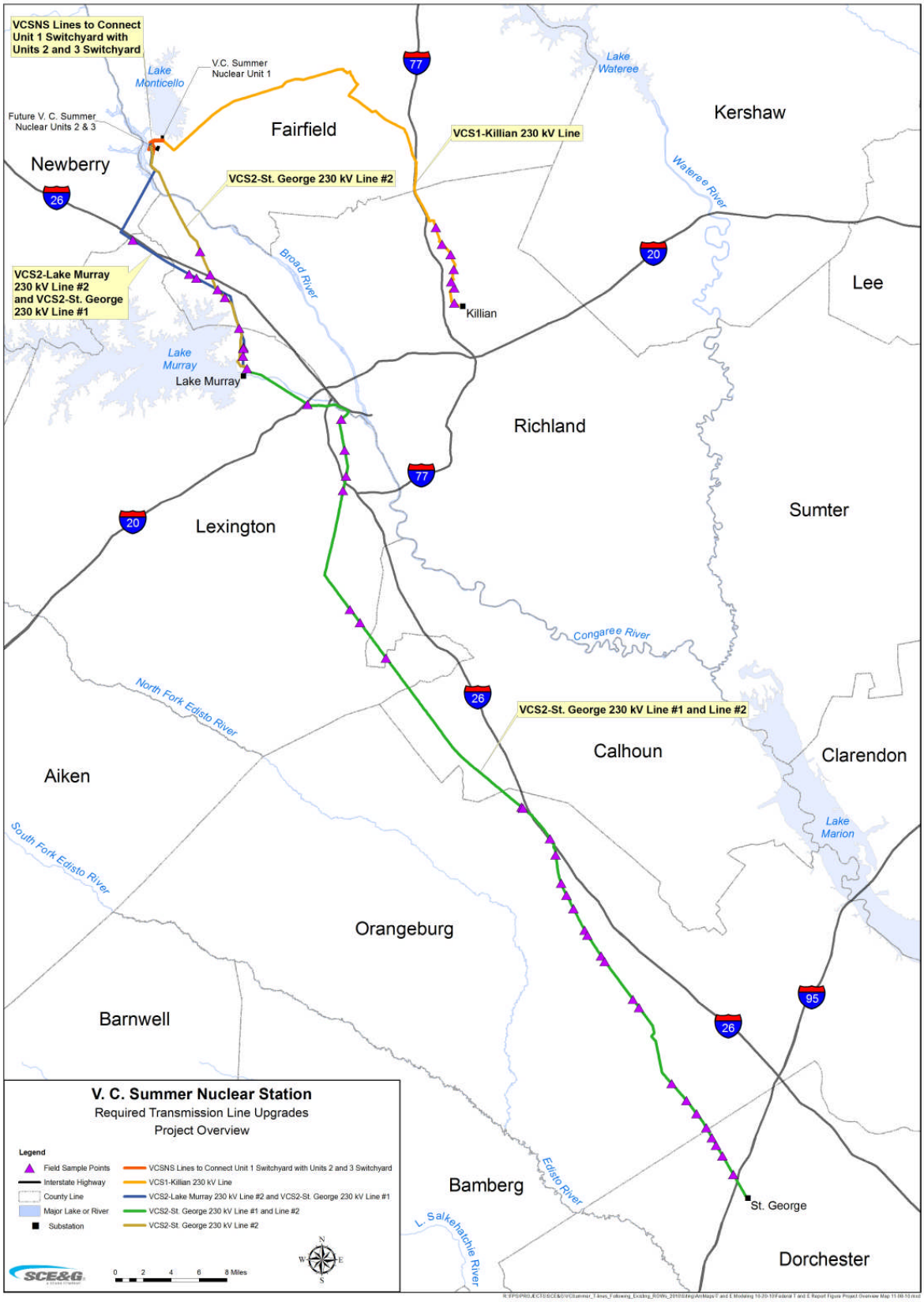
VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
Lake Monticello
V.C. Summer Nuclear Unit 1
Future V. C. Summer Nuclear Units 2 & 3
Fairfield
Newberry
VCS1-Killian 230 kV Line
VCS2-St. George 230 kV Line #2
VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
Broad River
Killian
Lake Murray
Lake Murray
Lake Wateree
Kershaw
Wateree River
Lee
Richland
Sumter
Lexington
Congaree River
North Fork Edisto River
VCS2-St. George 230 kV Line #1 and Line #2
Calhoun
Clarendon
Aiken
Lake Marion
South Fork Edisto River
Orangeburg
Barnwell
Bamberg
Edisto River
St. George
L. Salkehatchie River
Dorchester
77
26
20
95
V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Project Overview
Legend
Field Sample Points
Interstate Highway
County Line
Major Lake or River
Substation
VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
VCS1-Killian 230 kV Line
VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
VCS2-St. George 230 kV Line #1 and Line #2
VCS2-St. George 230 kV Line #2
SCE&G
0 2 4 6 8 Miles
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Table 1. Federally-listed endangered and threatened species potentially-occurring on transmission corridors associated with the V. C. Summer Project.

SCIENTIFIC NAME	COMMON NAME	STATUS	CAL	DOR	FAI	LEX	NEW	OBU	RIC	HABITAT
Acipenser brevirostrum	Shortnose Sturgeon	E	X	X		X		X	X	Large rivers with shoals
Ambystoma cingulatum	Frosted Flatwoods Salamander	T						X		Wet pine flatwoods and isolated wetlands
Echinacea laevigata	Smooth Coneflower	E				X			X	Calcium- and magnesium rich clays in open woods
Haliaeetus leucocephalus	Bald Eagle	BGEPA-T	X	X	X	X	X	X	X	Large rivers and lakes
Lasmigona decora	Carolina Heelsplitter	E			X					Small streams
Lindera melissifolia	Pondberry	E		X						Isolated wetlands and their margins
Lysimachia asperulifolia	Rough-leaved Loosestrife	E							X	Fire maintained acidic bogs in the Sandhills
Mycteria americana	Wood Stork	E							X	Cypress-tupelo and other wetlands
Oxypolis canbyi	Canby's dropwort	E		X				X	X	Pond cypress savannahs
Picoides borealis	Red-cockaded Wood-pecker	E	X	X		X		X	X	Open, mature, fire-maintained pine woods

Counties: CAL-Calhoun; DOR-Dorchester; FAI-Fairfield; LEX-Lexington; NEW-Newberry; OBU-Orangeburg; RIC-Richland.

Status: E-endangered; T-threatened; BGEPA-protected under the special Bald and Golden Eagle Protection Act.

grows in open woods in clayey, high magnesium and high calcium soils (Murdock, 1995; U. S. Fish and Wildlife Service, 2010d; Schafale and Weakley, 1990; Gaddy 1991). Canby's dropwort is a wetland species that is found primarily in isolated pond cypress (*Taxodium ascendens*) savannah-like wetlands (Gaddy 2006; U. S. Fish and Wildlife Service, 2010b). The rough-leaved loosestrife is found in low pH Sandhill wetlands where frequent fire is present (Russo and Sweeney, 2000). The pondberry occurs in and along the margins of isolated wetlands (Russo and Sweeney, 2000; Schafale and Weakley, 1990)—in South Carolina, particularly those associated with limesinks.

The potentially-occurring endangered and threatened species, with the possible exception of the Bald Eagle, are not evenly distributed throughout the counties of the study area. The Shortnose Sturgeon is known only from the Broad River portion of the study area. The Red-cockaded Woodpecker is found primarily in the Coastal Plain, and the Wood Stork only nests in a few coastal counties. Canby's dropwort, a Coastal Plain species, is known from Richland, Orangeburg, and Dorchester Counties, but has never been seen in Lexington and Calhoun Counties. Pondberry has been reported from only Dorchester County. The Frosted Flatwoods Salamander is known only in the study area from an historic record in Orangeburg County, and the bog asphodel is known only from an historic record in Dorchester County. Rough-leaved loosestrife is known only from Richland County, and the smooth coneflower is known only from Richland and Lexington Counties.

Before fieldwork for this inventory began, all U. S. Fish and Wildlife and South Carolina Department of Natural Resources Department records—historical and current— for the above species (S. C. Department of Natural Resources, 2010; U. S. Fish and Wildlife Service, 2010a) were plotted on maps of the transmission corridors in the study area. According to these records, at the time this field inventory began, none of these species was known to occur within or along the margins of any of the transmission corridors in the study area.

Potential habitats for all of the potentially-occurring federally-listed species were also plotted on study area maps before fieldwork began. These potential habitats maps were compiled using natural color imagery of the study area with topographic, soil, and wetland features overlaid on the natural color imagery. Forty-eight field sites (Map 1) harboring potential habitat for the species in Table 1 were field-checked in late October and early November of 2010.

FINDINGS

Field sampling was begun in late October of 2010. In Richland and Lexington Counties, twelve sites were field-checked for the possible presence of the federally-listed (endangered) smooth coneflower (*Echinacea laevigata*), and fifteen sites that had potential habitat for the endangered rough-leaved loosestrife (*Lysimachia asperulifolia*) were visited in Richland, Lexington, and Calhoun Counties. In early November of 2010, twenty Orangeburg and Dorchester County sites were sampled for the possible presence of Canby's dropwort (*Oxypolis canbyi*) and pondberry (*Lindera melissifolia*). Findings are discussed below under species headings.

Smooth Coneflower (*Echinacea laevigata*) (federally-listed as endangered). Smooth coneflower is a rare species in the Aster Family (Asteraceae) and is found from Virginia south to Georgia (Gaddy, 1991). The South Carolina Plant Atlas (S. C. Plant Atlas, 2010) reports smooth coneflower from seven South Carolina counties. The South Carolina Department of Natural Resources (SCDNR, 2010) lists smooth coneflower from Richland County, while the Fish and Wildlife Service's (2010a) list of federal endangered species in S. C. reports the plant from both Richland and Lexington Counties.

The coneflower is found on clay soils especially rich in magnesium and calcium (with high pH) and is generally associated with Iredell, Mecklenberg, and Brevard Belt soils in the Carolinas and Georgia. The plant does not compete well in densely-shaded forest conditions and prefers open woods, roadsides, and prairie-like environments.

An earlier review of soil maps had indicated that some Mecklenberg, Orange, and Enon soils (all soil types with high pH) occurred in Richland, and Lexington Counties (Holsonback and Brewington, 2008; Lawrence, 1976 and 1978) along the VCS2-St. George #2, the VCS2-St. George #1, and the VCS2-Lake Murray #2 transmission lines, between Jenkinsville and Lake Murray. Because these soils types are potential habitats for the coneflower, the sites where they occurred were field-checked in late October of 2010. In all, twelve field sites (seven Orange sites, three Mecklenberg sites, and two Enon sites) within the transmission corridors were checked. Several species known to be associated with dry, high pH soils and smooth coneflower (Gaddy, 1991) such as Indian grass (*Sorghastrum nutans*), false indigo (*Baptisia cinerea*), and little blue stem (*Schizachyrium scoparium*) were found at these sites, but no smooth coneflower stems or basal leaves were seen during the fieldwork.

Rough-leaved Loosestrife (*Lysimachia asperulifolia*) (federally-listed as endangered).

Rough-leaved loosestrife is a North Carolina-South Carolina Sandhill endemic found in bogs and on bog margins in fire-maintained wetlands. It is only known from two counties in South Carolina—Richland and Darlington (S. C. Plant Atlas, 2010). In South Carolina, the plant is closely associated with Johnston soils. The VCS1-Killian transmission corridor (present line and proposed line) crosses seven areas of Johnston soils wetlands in Richland County (DeFrancesco, 1982; Lawrence, 1978) between the Killian Substation and Blythewood. The VCS2-St. George #1 and #2 transmission corridor crosses four major wetlands and three smaller wetlands dominated by Johnston and related soils (Lawrence, 1976) in Lexington County; one Johnston wetland is located near the border of Lexington and Calhoun County. These fifteen sites were field-checked for rough-leaved loosestrife in late October of 2010.

Just north and west of the Killian Substation, the proposed new Killian corridor will cross a large wetland complex on Johnston soils. Most of this area was forested and dominated by swamp tupelo (*Nyssa biflora*), tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), American holly (*Ilex opaca*), sweet gallberry (*Ilex coriacea*), cyrilla or ti-ti (*Cyrilla racemiflora*), bays (*Persea palustris* and *Magnolia virginiana*), fetterbush (*Lyonia lucida*), and ferns (*Osmunda cinnamomea, Osmunda spectabilis var. regalis, and Onoclea sensibilis*). A few small openings were found in these woods, but no rough-leaved loosestrife habitat was present. There were a few openings along the margins of the existing Killian transmission corridor. Here, open peat (*Sphagnum* sp.) bogs were present, but the vegetation here was too thick for the loosestrife and there is no history of fire in the area. The remaining six Johnston sites north to Blythewood were dominated by tulip poplar with one exception, a site with standing water that had been recently broadcast-sprayed with herbicides. None of these site supported habitat for rough-leaved loosestrife.

The VCS2-St. George #1 and #2 corridor crossing of the Johnston wetland bordering Six Mile Creek in Lexington County was very weedy with tearthumb (*Polygonum sagittaum*), spotted knotweed (*Polygonum punctatum*), false nettle (*Boehmeria cylindrica*), and giant plume grass (*Erianthus giganteus*) dominating the right-of-way. The Congaree Creek crossing just to the south was less weedy with giant plumegrass, soft rush (*Juncus effusus*), Virginia meadowbeauty (*Rhexia virginica*), rough-leaved goldenrod (*Solidago rugosa*), other rushes (*Juncus cyperinus* included), beak rushes (*Rhynchospora corniculata* and *Rhynchospora caduca*), and sedges (*Carex* spp.). The crossing of Sandy Run Creek and an associated tributary were similarly weedy. Three pond backwater sites in Lexington County and one pond backwater at the border of Lexington and Calhoun County, all on Johnston or related muck soils, were found to be dominated by giant plume grass, meadowbeauty species (*Rhexia* spp.), and disturbed-site beakrushes and sedges. Because of the lack of fire and the density of the herbaceous vegetation layer at these sites, no habitat for rough-leaved loosestrife was present.

Canby's Dropwort (or Cowbane) (*Oxypolis canbyi*) (federally-listed as endangered).

Canby's dropwort historically ranged from Delaware to Georgia. In South Carolina, it is known from eleven counties, according to the South Carolina Plant Atlas (S. C. Plant Atlas, 2010). In the study area, it has been reported from Richland, Orangeburg, and Dorchester Counties. Although it has been found in open, grassy swamp tupelo gum (*Nyssa biflora*) swamps and in open, disturbed Carolina bays, its most common habitat type is the pond cypress (*Taxodium ascendens*) savannah (Gaddy, 2006). Pond cypress savannahs are found in shallow, isolated wetlands in the Atlantic and Gulf Coastal Plains. Maintained by natural water level fluctuations and periodic fire, these wetlands generally have standing water in the winter and are dry, grassy environments in late summer and fall (Gaddy, 2006).

Twenty-one wetland depressions on the VCS2-St. George #1 and #2 Corridors were field-checked in early November of 2010. Most of these wetlands were too dry for Canby's dropwort (they had been previously drained for agricultural purposes) or did not harbor pond cypress. The corridor, however, does pass through four pond cypress wetlands near the Orangeburg-Dorchester County line. One of the wetlands was a pond cypress savannah with potential habitat for Canby's dropwort. The corridor adjacent to this wetland was searched. Some of the companion plants for Canby's dropwort—*Hypericum fasciculatum, Aristida affinis, Carex striata, Ilex myrtifolia,* etc.—were present in the transmission corridor; however, no Canby's dropwort plants were found in the corridor or in the adjacent wetland. The three other pond cypress wetlands examined were either too wet (two were deep depressions) or too thick (one had a dense canopy of pond cypress and swamp tupelo) to harbor Canby's dropwort. Nevertheless, the corridor adjacent to these three sites was searched for Canby's dropwort, but no plants were found.

The fruit of Canby's dropwort in late autumn.

Pondberry or Southern Spicebush (*Lindera melissifolia*) (federally-listed as endangered).

Pondberry is found from North Carolina south through the Atlantic and Gulf Coastal Plain of South Carolina, Georgia, Florida, Mississippi, Alabama, and Louisiana north to Arkansas and Missouri. The small shrub is known from three counties in South Carolina—Berkeley, Colleton, and Beaufort, according to the South Carolina Plant Atlas (S. C. Plant Atlas, 2010). The U. S. Fish and Wildlife Service (U. S. Fish and Wildlife Service, 2010a) also list it from Dorchester County. Weakley (2010) gives its habitat as "wet flats and depressions". In South Carolina, however, it is strongly associated with isolated depressions and their margins, especially the Honey Hill "limesinks" in Berkeley County. The small shrub is usually found along the margin of the depression in partially open sunlight. It does not appear to tolerate dense shade and is absent where shrubs are dense in wetland margins.

Pondberry was not seen during our field examination of twenty-one wetland sites on the VCS2-St. George #1 and # 2 transmission corridor and environs. Furthermore, no good habitat for the plant appeared to occur within or along the transmission corridor.

Sweet grass (*Muhlenbergia capillaris*) in the VCS2-St. George #1 and #2 Corridor.

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Appendix B. Figures prepared by Pike Energy Solutions, November 2010

VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard

Future V. C. Summer Nuclear Units 2 &3

V.C. Summer Nuclear Unit 1

VCS1-Killian 230 kV Line

VCS2-St. George 230 kV Line #2

VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1

Lake Monticello

Lake Wateree

Wateree River

Broad River

Lake Murray

Lake Murray

Killian

Sheet 1

Sheet 2

Sheet 3

Sheet 4

Sheet 5

Congaree River

North Fork Edisto River

South Fork Edisto River

Lake Marion

VCS2-St. George 230 kV Line #1 and Line #2

St. George

Edisto River

Fairfield

Newberry

Lexington

Richland

Kershaw

Lee

Sumter

Calhoun

Clarendon

Aiken

Orangeburg

Barnwell

Bamberg

Colleton

Dorchester

77

26

20

95

V. C. Summer Nuclear Station

Required Transmission Line Upgrades
Biological Assessment
Index Map

Legend

- Substation
- Interstate Highway
- County Line
- Major Lake or River
- VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
- VCS1-Killian 230 kV Line
- VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
- VCS2-St. George 230 kV Line #1 and Line #2
- VCS2-St. George 230 kV Line #2

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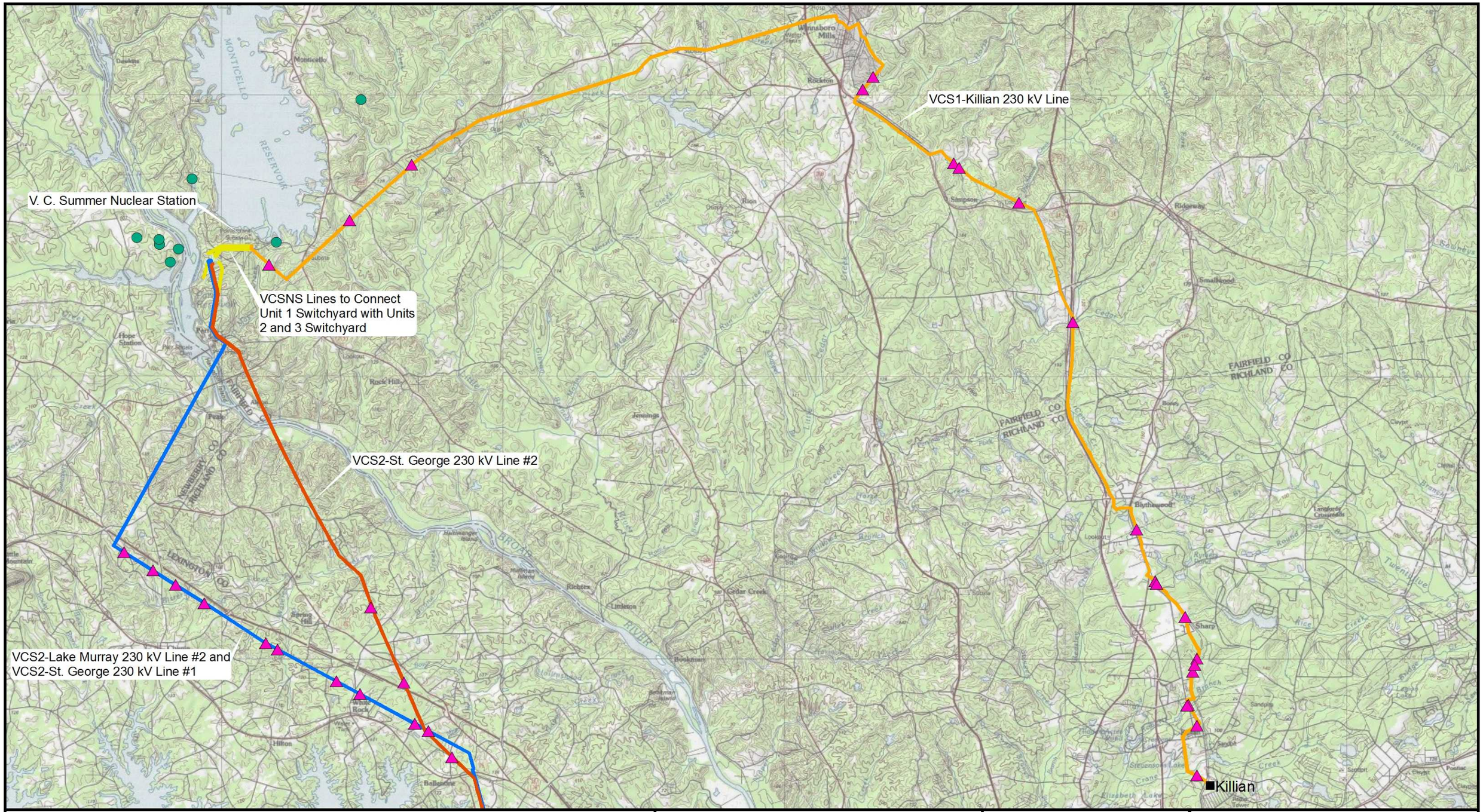

Legend

- Field Sample Point
- Bald Eagle *
- Substation
- VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
- VCS1-Killian 230 kV Line
- VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
- VCS2-St. George 230 kV Line #2

* Source: US Fish and Wildlife Service, SC Department of Natural Resources (Heritage Trust Program), and SCE&G

Note: Recorded protected species occurrences are shown within 2 miles of the transmission line corridors.

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SCE&G® A SCANA COMPANY

V. C. Summer Nuclear Station

Required Transmission Line Upgrades
Biological Assessment
Sheet 1 of 5

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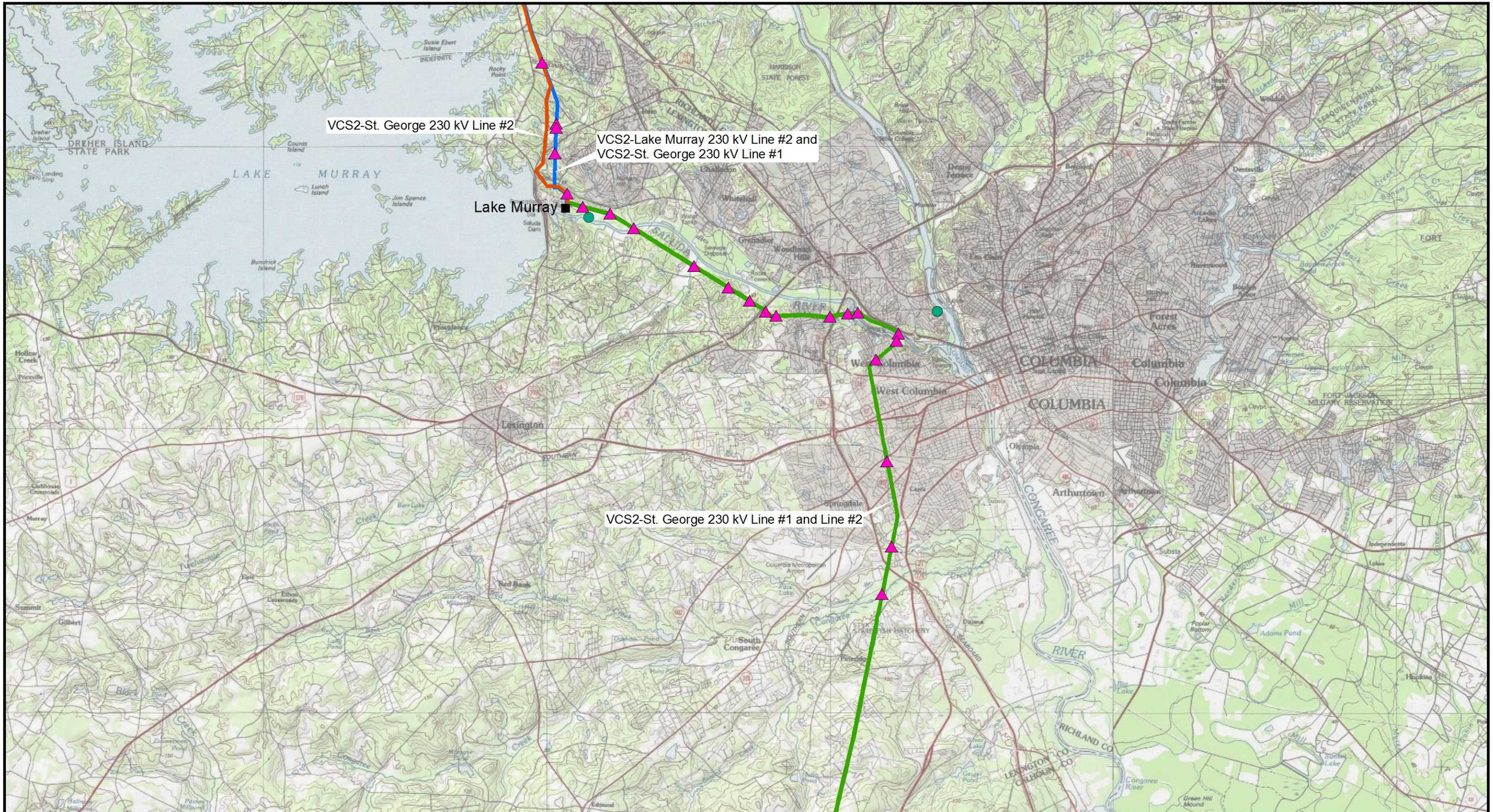

Legend

- Field Sample Point
- Bald Eagle *
- Substation
- VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
- VCS2-St. George 230 kV Line #1 and Line #2
- VCS2-St. George 230 kV Line #2

* Source: US Fish and Wildlife Service, SC Department of Natural Resources (Heritage Trust Program), and SCE&G

Note: Recorded protected species occurrences are shown within 2 miles of the transmission line corridors.

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V. C. Summer Nuclear Station

Required Transmission Line Upgrades
Biological Assessment
Sheet 2 of 5

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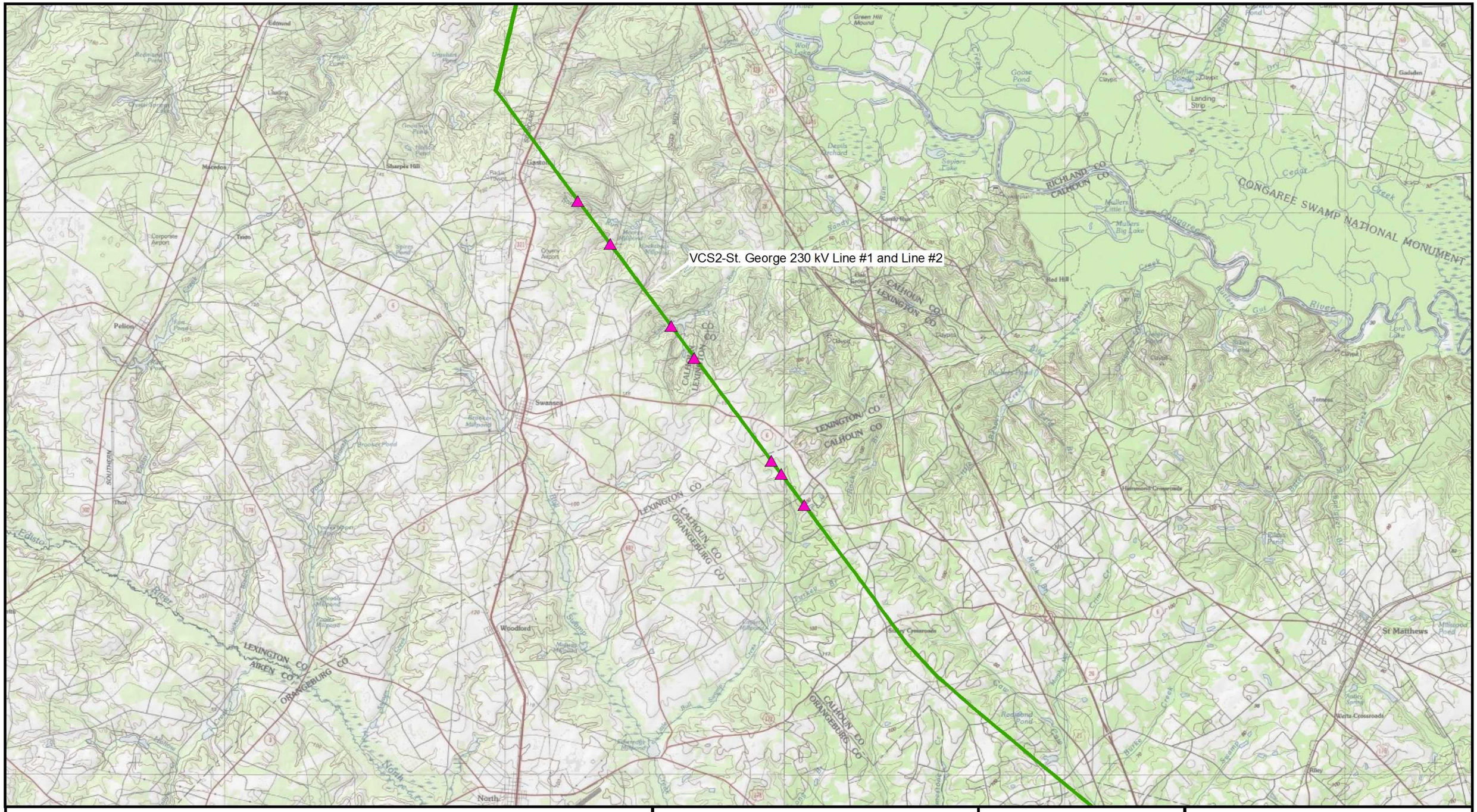

Legend

- Field Sample Point
- VCS2-St. George 230 kV Line #1 and Line #2

Note: There are no recorded protected species occurrences within 2 miles of this transmission line corridor.

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V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Biological Assessment
Sheet 3 of 5

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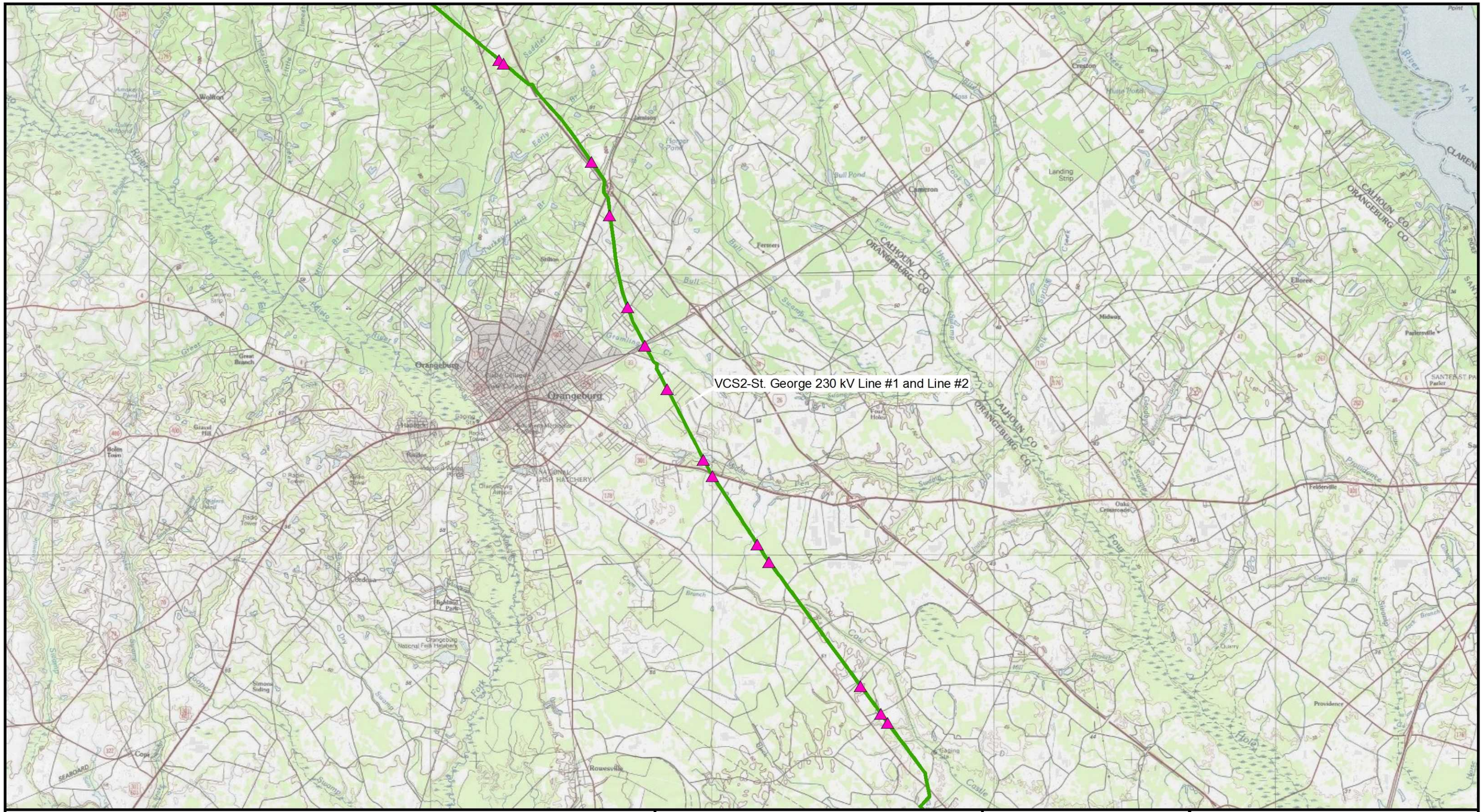

Legend

- Field Sample Point
- VCS2-St. George 230 kV Line #1 and Line #2

Note: There are no recorded protected species occurrences within 2 miles of this transmission line corridor.

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V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Biological Assessment
Sheet 4 of 5

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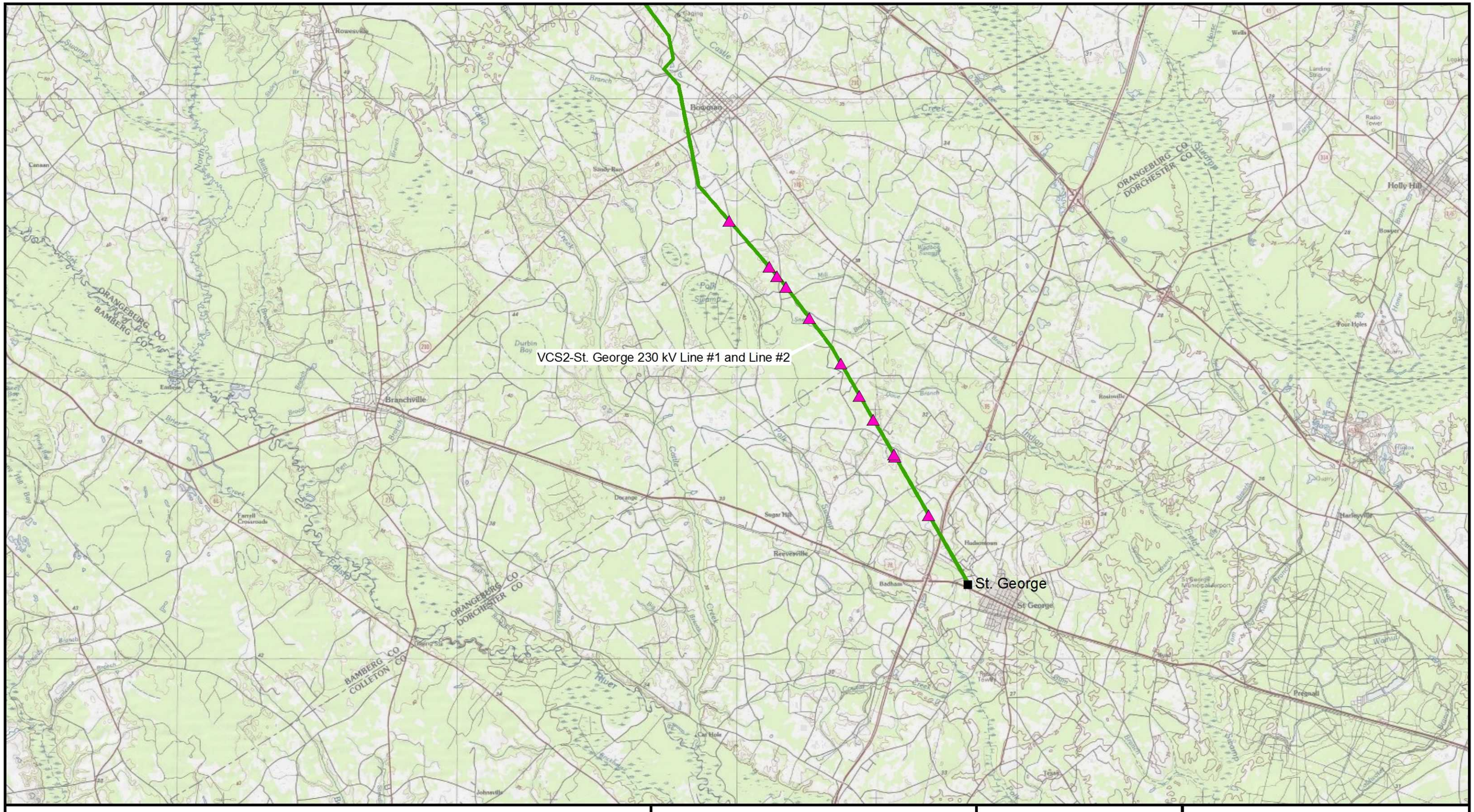

Legend

- Field Sample Point
- Substation
- VCS2-St. George 230 kV Line #1 and Line #2

Note: There are no recorded protected species occurrences within 2 miles of this transmission line corridor.

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V. C. Summer Nuclear Station

Required Transmission Line Upgrades
Biological Assessment
Sheet 5 of 5

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INVENTORY OF STATE-LISTED RARE THREATENED, AND ENDANGERED SPECIES ON TRANSMISSION CORRIDORS ASSOCIATED WITH THE V. C. SUMMER PROJECT

Sweet grass (*Muhlenbergia capillaris*) in the VCS-St. George #1 and #2 Corridor.

by

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for
Pike Electric Corporation
Charlotte, North Carolina

November 2010

INTRODUCTION

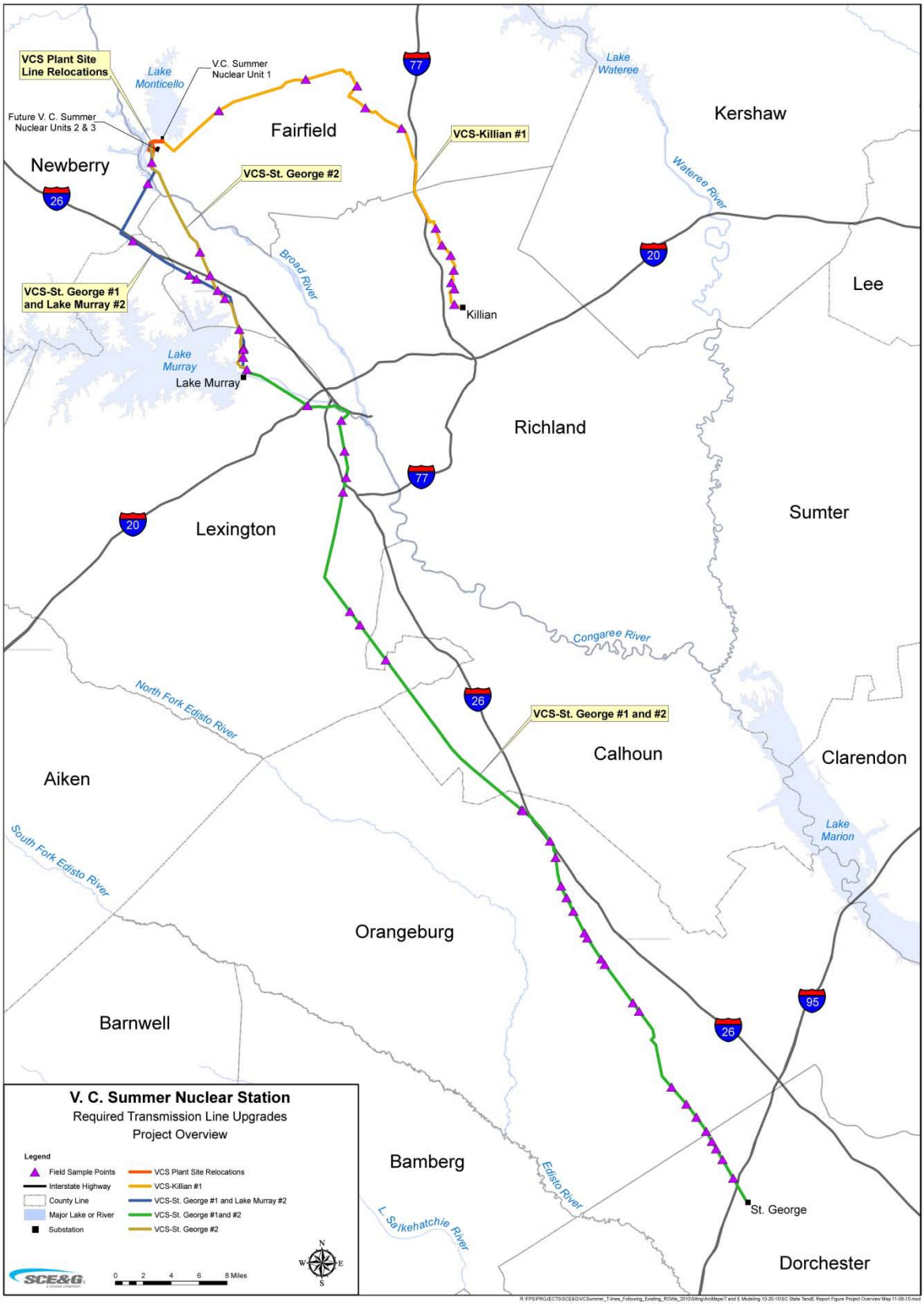
This report presents the findings of an inventory of state-listed endangered, threatened, and candidate species on existing and proposed transmission corridors associated with South Carolina Electric and Gas's V. C. Summer Project. The transmission corridors or "study area" for this investigation included the VCS-Killian #1 (existing and new), the VCS-St. George #1, the VCS-St. George #1 and Lake Murray #2, and the VCS-St. George #1 and #2 (see Map 1).

METHODOLOGY

A literature and internet review of the state-listed species potentially-occurring in the study areas for electric power transmission lines associated with the V. C. Summer Project was conducted in October of 2010. Over 170 species of state-listed plants and animals are known from the seven counties through which the V. C. Summer Project corridors pass (see Table 2 in Appendix for a complete list of these species). Of these 170 species, 41 species are known to occur within five miles of the V. C. Summer Project corridors (Table 1 below). Because potential habitat for only 17 of these 41 species occurs on the V. C. Summer corridors, field searches concentrated on these 17 species.

Before fieldwork for this inventory began, all South Carolina Department of Natural Resources Department records—historical and current— for these 17 species (S. C. Department of Natural Resources, 2010) were plotted on maps of the transmission corridors in the study area. According to these records, at the time this field inventory began, none of these species was known to occur within or along the margins of any of the transmission corridors in the study area.

Potential habitats for these state-listed species were also plotted on study area maps before fieldwork began. These potential habitats maps were compiled using natural color imagery of the study area with topographic, soil, and wetland features overlaid on the natural color imagery. Over fifty field sites harboring potential habitat for the species in Table 1 were field-checked in late October and early November of 2010.


VCS Plant Site Line Relocations
V.C. Summer Nuclear Unit 1
Lake Monticello
Future V. C. Summer Nuclear Units 2 & 3
Fairfield
Newberry
VCS-Killian #1
VCS-St. George #2
VCS-St. George #1 and Lake Murray #2
Broad River
Killian
Lake Murray
Lake Murray
Lake Wateree
Kershaw
Wateree River
Lee
Richland
Lexington
Sumter
Congaree River
North Fork Edisto River
VCS-St. George #1 and #2
Calhoun
Clarendon
Aiken
Lake Marion
South Fork Edisto River
Orangeburg
Barnwell
Bamberg
Edisto River
L. Salkehatchie River
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VCS-Killian #1
VCS-St. George #1 and Lake Murray #2
VCS-St. George #1and #2
VCS-St. George #2
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Table 1. State-listed rare, threatened, and endangered species known to occur within five miles of transmission corridors associated with the V. C. Summer Project*

Scientific Name	Common Name	State Status/ Rank	CAL	DOR	FAI	LEX	NEW	ORA	RIC	Habitat Present on Corridors?
Astragalus michauxii	Sandhill milkpea	S3							X	NO
Botrychium lunarioides	winter grape-fern	S1							X	NO
Burmania biflora	northern blue-thread	S2				X			X	YES
Coreopsis gladiata	southeastern tickseed	SNR		X		X			X	YES
Etheostoma collis	Carolina darter	ST/SNR							X	NO
Euonymus atropurpureus	eastern wahoo	S1					X			NO
Frasera carolinensis	colombo	S2			X		X			YES
Fundulus diaphanus	Banded Killifish	S1							X	NO
Hyla andersoni	Pine-barrens Treefrog	ST/S2S3							X	YES
Hymenocallis coronaria	shoals spider-lily	S2					X		X	NO
Hypercum nitidum	**Carolina St. John's-wort**	**S1**							**X**	**YES SEE TEXT**
Ipomopsis rubra	red standing-cypress	S2	X						X	NO
Isoetes piedmontana	Piedmont quillwort	S2			X					NO
Lechea torreyi	Torrey's pinweed	SNR							X	NO
Liparis lilifolia	lily-leaved twayblade	S1					X			NO
Litsea aestivalis	pond spice	S3						X		YES
Ludwigia spathulata	spatulate seedbox	S3							X	NO
Lycopus cokeri	Carolina bugleweed	S2	X			X			X	YES
Magnolia pyramida	pyramid magnolia	S1	X				X		X	NO
Menispermum canadense	Canada moonseed	S2S3	X	X			X			NO
Minuarta uniflora	single-flowered stichwort	S3			X					NO
Nestronia umbellula	Indian olive	S3	X						X	NO
Nolina georgiana	Georgia beargrass	S3						X	X	YES
Notropsis chiliticus	Red-lipped Shiner	S1?							X	NO
Oxypolis ternata	savannah cowbane	S1				X				YES
Pityopsis pinifolia	pine-leaved golden aster	S2				X			X	YES
Psilotum nudum	whisk fern	S1							X	NO

Scientific Name	Common Name	Status/ Rank	CAL	DOR	FAI	LEX	NEW	ORA	RIC	Habitat Present on Corridors?
Rhinichthys atratulus	Black-nosed Dace	S1							X	NO
Rhododendron eastmanii	May white	S1	X		X		X		X	NO
Rorippa sessiliflora	stalkless yellowcress	SNR				X				NO
Sarracenia rubra	sweet pitcher-plant	S4							X	YES
Sciurus niger	Eastern Fox Squirrel	S4	X					X	X	YES
Scleria baldwinii	Baldwin's nutrush	S2						X		YES
Scutellaria parvula	dwarf skullcap	S2S3			X					NO
Sedum pusillum	granite rock stonecrop	S2			X					NO
Sporobolus teretifolius	wire-leaved dropseed	S1				X				YES
Stylisma pickeringii var. pickeringerii	Pickering's morning-glory	S2				X				NO
Symphyotrichum georgianum	Georgia aster	C/SNR			X				X	YES
Tofieldia glabra	white false-asphodel	S1S2							X	YES
Tridens carolinianus	Carolina fluff grass	S2				X		X		YES

***According to element occurrence records from the South Carolina Department of Natural Resources Department's geographic database (S. C. Department of Natural Resources, 2010).**

Underlining indicates animal species.

C-federal candidate for listing; SE-endangered statewide; ST-threatened statewide; S1-critically imperiled statewide; S2-imperiled statewide; S3-vulnerable statewide; S4-secure statewide; SNR-species not ranked.

Bold indicates found in transmission corridor during this inventory.

FINDINGS

Thirty-three sites in Calhoun, Fairfield, Newberry, Lexington, and Richland Counties were visited in late October of 2010, and 20 additional sites in Orangeburg and Dorchester Counties were field-checked in early November of 2010. Only one state-listed species was found in the study corridors—Carolina St. Johns-wort (*Hypericum nitidum*), which was found in the VCS-St. George #1 and #2 in Lexington County. The species discussed below are the species for which habitat existed on the V. C. Summer corridors (Table 1).

***Burmannia biflora* (northern blue-thread).** Northern blue-thread is a diminutive (usually less than four inches tall) herb found in open bogs. According to the South Carolina Department of Natural Resources, it is ranked as "imperiled" in S. C. (S2, see Table 1). The plant is known from 13 counties in South Carolina, including Richland and Lexington (S. C. Plant Atlas, 2010). It has been found in a seepage bog less than one mile from the VCS-St. George #1 and #2 corridor in Lexington County. It was not found during searches of wetlands in the corridor in Richland, Lexington, Calhoun, Orangeburg, and Dorchester Counties.

***Coreopsis gladiata* (southeastern tickseed).** Known from 21 counties in South Carolina, southeastern tickseed is listed as rare in S. C. but is not ranked (Table 1). It is known from a bog in Lexington County less than a mile from VCS-St. George #1 and #2, but it was not seen in or adjacent to the corridor itself.

***Frasera carolinensis=Swertia carolinensis* (colombo).** Colombo is a tall herb with a large basal rosette found in nutrient-rich woods and the margins of woods. In South Carolina, it is known only from five counties (S. C. Plant Atlas, 2010) and is ranked as "imperiled" (S2) in the state. It is known from one location in Newberry County near the VCS-St. George #1 and Lake Murray #2 corridor and one location in Fairfield County just off the VCS-St. George #2 corridor. Rich woods along the edges of both corridors near the two populations were searched, but no plants of this species could be found in the corridors or in the adjacent woods.

***Hyla andersonii* (Pine-barrens Treefrog).** The Pine-barrens Treefrog is listed as "threatened" in South Carolina by the S. C. Department of Natural Resources (Table 1). It is known from two historic locations approximately three miles east and one-half mile west of the VCS-Killian #1 corridor. The frog's preferred habitat is open bogs with shrubby margins. Marginal habitat for the species was seen along the existing corridor just north of the Killian Substation. The treefrog was not seen or heard in or along the corridor.

***Hypericum nitidum* (Carolina St. Johns-wort).** Carolina St. Johns-wort is a colonial shrub known from five counties in South Carolina and is ranked S1 or critically imperiled in the state (S. C. Plant Atlas, 2010; SCDNR, 2010). It was known to occur in a seepage bog less than one mile from the VCS-St. George #1 and #2 corridor. In late October, two colonies of Carolina St. Johns-wort were found in the corridor of VCS-St. George #1 and #2 just before its crossing of Congaree Creek in Lexington County. One colony at N3355.8338/W08105.2734 had approximately 75 plants that covered 125 square feet; the second colony at N335.9321/W08105.2678 had 20 plants and covered 50 square feet. Companion plants here were: *Erianthus giganteus* (giant plumegrass), *Solidago rugosa* (rough goldenrod), *Rhexia virginica* (Virginia meadowbeauty), and *Juncus effusus* (soft rush).

The rare Carolina St. Johns-wort, found on VCS-St. George #1 and #2 corridor in Lexington County, is a woody shrub with narrow, needle-like leaves.

***Litsea aestivalis* (pond spice).** Pond spice is a shrub that grows along the margins of isolated wetlands. It is ranked as "vulnerable" (S3) in South Carolina (Table 1) and is known from eleven counties in South Carolina, including Orangeburg and Dorchester (S. C. Plant Atlas, 2010). Two populations of pond spice are known in southern Orangeburg County just southwest of the VCS-St. George #1 and #2 corridor. No plants of this species were found during searches of the margins of wetlands along the corridor in Orangeburg and Dorchester Counties.

***Lycopus cokeri* (Carolina bugleweed).** Carolina bugleweed is a small herb found in seven Sandhill counties in South Carolina (S. C. Plant Atlas, 2010). A North Carolina-South Carolina endemic, it is ranked as "imperiled" (S2) in South Carolina (SCDNR, 2010). It is known from a population in Lexington County less than one mile from the VCS-St. George #1 and #2 corridor. Open boggy areas in northern Richland County and in southern Lexington and Calhoun Counties were searched for the plant. No plants of this species, however, could be found on or along the corridors.

***Nolina georgiana* (Georgia beargrass).** Georgia beargrass is a lilaceous plant that reaches the northern limits of its range in South Carolina. In South Carolina, it is ranked as "vulnerable" (S3) statewide and is known from seven counties. In Lexington County, a population of the plant is known to occur less than one mile northeast of the VCS-St. George #1 and #2 corridor in open, longleaf pine (*Pinus palustris*) woodlands. This habitat type was searched in Lexington and Calhoun Counties, but the plant was not found on or adjacent to the corridor.

***Oxypolis ternata* (savannah cowbane).** The savannah cowbane is ranked as "critically imperiled" (S1) in South Carolina (SCDNR, 2010). It is an apiaceous plant known from eight counties in South Carolina, including Lexington County (S. C. Plant Atlas, 2010). It is known from a seepage bog in Lexington County east of the VCS-St. George #1 and #2 corridor. It requires fire and does not compete well with densely-growing grasses. Searches were conducted in Richland, Lexington, and Calhoun Counties, along the V. C. Summer Project corridors for the species, but no plants were found.

***Pityopsis pinifolia* (pine-leaved golden aster).** Pine-leaved golden aster is an October-blooming yellow composite known from only four counties in South Carolina (S. C. Plant Atlas, 2010). It is ranked as "imperiled" (S2) in the state (SCDNR, 2010). It is often found along roads and in partially-disturbed areas. Several populations of the plant are known from within five miles of the VCS-St. George #1 and #2 corridor in Lexington and Calhoun Counties. No plants, however, were found in the corridor there or along its margins.

***Sarracenia rubra* (sweet pitcher-plant).** Sweet pitcher-plant is an herbaceous plant that grows in non-forested boggy environments. It is known from 15 counties in South Carolina (S. C. Plant Atlas, 2010) and is ranked as "secure" (S4) statewide by SCDNR (2010). It has been found in a bog less than one mile east of the VSC-St. George #1 and #2 corridor in Lexington County. Field searches for the pitcher-plant were carried out in Richland, Lexington, and Calhoun Counties. Good habitat for the plant was found near the Killian Substation on VCS-Killian #1 and around Congaree Creek on VCS-St. George #1 and #2, but no plants of this species were found there.

***Sciurus niger* (Eastern Fox Squirrel).** The Eastern Fox Squirrel is a large, melanistic rodent that inhabits pine and pine-mixed hardwood forests. It is found primarily in the Coastal Plain of South Carolina and is ranked as "secure" (S4) statewide by SCDNR (2010). Although there are records of the squirrel near the corridors, the squirrel was not seen in or adjacent to the corridors. No special studies were conducted to determine its status along the corridors.

***Scleria baldwinii* (Baldwin's nutrush).** Baldwin's nutrush is a tall sedge found in wet pine and pond cypress savannahs in the Coastal Plain. It is known from 10 counties in the state (S. C. Plant Atlas) and is ranked as "imperiled" (S2) in South Carolina, according to SCDNR (2010). A population of the plant is known from a pond cypress savannah approximately a mile southeast of the VCS-St. George #1 and #2 corridor near Bowman in Orangeburg County. Several pond cypress savannahs along the transmission corridor in Orangeburg and Dorchester County were searched for the nutrush, but the plant was not found in or adjacent to the corridor.

***Sporobolus teretifolius* (wire-leaved dropseed).** Wire-leaved dropseed is a grass that is found in wet savannahs and bogs in only four counties in South Carolina (S. C. Plant Atlas, 2010). Ranked as "critically imperiled" (S1) in the state, it is known from a bog in Lexington County less than one mile from the VCS-St. George #1 and #2 corridor. Bog and wet savannah habitats in and along the corridors in Richland, Lexington, Calhoun, Orangeburg, and Dorchester Counties were searched, but the rare grass could not be found.

***Symphyotrichum georgianum=Aster georgianus* (Georgia aster).** Georgia aster occurs in the Piedmont of the Carolinas on xeric, calcareous red clay soils. It was probably found in open post oak (*Quercus stellata*) savannahs in the pre-Columbian Piedmont, but now is primarily found on roadsides and in railroad and power line rights-of-way. In South Carolina, it is known from nine counties (S. C. Plant Atlas, 2010) and is not ranked (SNR); however, it a candidate for listing by the Fish and Wildlife Service (U. S. Department of the Interior, 2010). Because the VCS-Killian # 1 transmission corridor passes within a mile of a known Georgia aster population in Fairfield County, four nearby sites where the VCS-Killian # 1 corridor crosses roads and railroad rights-of-way were field-checked for the possible presence of the aster. Three of the four sites had recently been mowed close to the ground and were dominated by fescue (*Lolium pratense*) and Bahia grass (*Paspalum notatum*). Piedmont aster (*Symphyotrichum patens=Aster patens*) was present at two of the sites along the woodland margins of the corridor, but no Georgia asters were seen.

***Tofieldia glabra* (white false-asphodel).** White false-asphodel grows in bogs and wet savannahs and is known from seven counties in South Carolina (S. C. Plant Atlas, 2010). It is ranked "critically imperiled/imperiled" (S1S2) statewide and is found in Richland and Lexington Counties (SCDNR, 2010). It has been reported from a seepage bog less than a mile from the VCS-St. George #1 and #2 corridor. Marginal habitat for the plant was found along the corridor in Lexington County, but no plants were seen.

***Tridens carolinianus* (Carolina fluff grass).** Carolina fluff grass grows in moist depressions and bog margins in eight South Carolina counties (S. C. Plant Atlas, 2010). It is ranked as "imperiled" (S2) in the state. It is known from bogs in Lexington County, one of which is less than a mile from the VCS-St. George #1 and #2 corridor. Wetland sites in Richland, Lexington, and Calhoun Counties were searched for the plant, but it could not be found.

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APPENDIX

Table 2. State-listed rare, threatened, and endangered species known from V. C. Summer Project corridor study area counties.*

Scientific Name	Common Name	State Status/ Rank	CAL	DOR	FAI	LEX	NEW	ORA	RIC
Agalinis tenella	false-foxglove	SNR		X					X
Agrimonia incisa	incised groovebur	S2						X	
Amphicarpum muehlenberiganum	blue maiden-cane	S2S3						X	
Andropogon gyrans var. stenophyllus	Elliott's bluestem	S1				X			
Andropogon perangustatus	narrow-leaved bluestem	S1							X
Aristida condensata	Piedmont three-awned grass	S2	X			X		X	X
Asplenium heteroresiliens	Wagner's spleenwort	S1							X
Asplenium pinnatifidum	lobed spleenwort	S1				X			
Asplenium resilens	black-stemmed spleenwort	S1		X				X	
Aster elliottii	Elliott's aster	S3							X
Astragalus michauxii	**sandhill milkpea**	**S3**							**X**
Bacopa cyclophylla	Coastal Plain water-hyssop	S1						X	
Balduina atropurpurea	purple balduina	S1							X
Botrychium lunarioides	**winter grape-fern**	**S1**							**X**
Burmania biflora	**northern blue-thread**	**S2**				**X**			**X**
Calmovilfa brevipilis	pine-barrens reed-grass	S1							X
Campanulastrum americanum	tall bellflower	S1	X						
Carex amphibola	narrow-leaved sedge	SNR						X	
Carex basiantha	widow sedge	S2	X	X				X	
Carex cherokeensis	Cherokee sedge	S2		X					X
Carex collinsii	Collin's sedge	S2				X			X
Carex crus-corvi	ravensfoot sedge	S2							X
Carex decomposita	cypress-knee sedge	S2						X	
Carex elliottii	Elliott's sedge	S1							X
Carex granularis	meadow sedge	S2		X				X	
Carex oligocarpa	eastern few-fruited sedge	SNR		X	X				
Carex socialis	social sedge	S1							X
Cayaponia quinqueloba	climbing cucumber vine	S1?							X
Chrysoma pauciflosculosa	woody goldenrod	S1S2				X			
Clemmys guttata	Spotted Turtle	ST/S5		X					
Collinsonia serotina	Walter's horsebalm	S1							X
Condylura cristata	Star-nosed Mole	S3?							X
Coreopsis gladiata	**southeastern tickseed**	**SNR**		**X**		**X**			**X**
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	SE/S2?						X	X

Scientific Name	Common Name	Status/ Rank	CAL	DOR	FAI	LEX	NEW	ORA	RIC
Dirca palustris	eastern leatherwood	S2			X				
Dodecatheon meadia	shooting-star	S1?	X		X				
Distocambarus youngineri	a crayfish	S1					X		
Dryopteris carthusiana	spinulose shield fern	S1							X
Elanoides forficatus	Swallow-tailed Kite	SE/S2		X					
Eleocharis robbinsii	Robbins' spikerush	S2							X
Eleocharis vivipara	viviparous spike-rush	S1		X					
Elimia catenaria	Gravel Elimia	SNR							X
Elliptio congaraea	Carolina Slabshell	S3						X	
Elliptio lanceolata	yellow lance	SNR					X		
Epidendrum canopseum	green-fly orchid	S3		X					
Etheostoma collis	**Carolina darter**	**ST/SNR**							**X**
Euonymus atropurpureus	**eastern wahoo**	**S1**					**X**		
Eupatorium fistulosum	hollow Joe-pye weed	SNR					X		
Frasera carolinensis	**colombo**	**S2**			**X**		**X**		
Fundulus diaphanus	**Banded Killifish**	**S1**							**X**
Gaylussacia mosieri	wooly huckleberry	S1				X			
Gopherus polyphemus	Gopher Tortoise	SE/S1		X					
Helenium pinnatifidum	Southeastern sneezeweed	S2						X	
Heteranthera reniformis	kidney-leaved mud-plantain	S1	X				X		
Heterodon simus	Southern Hog-nosed Snake	SNR							X
Hyla andersoni	**Pine-barrens Treefrog**	**ST/S2S3**							**X**
Hymenocallis coronaria	***shoals spider-lily***	***S2***					***X***		***X***
Hypericum adpressum	creeping St. John's-wort	S2							X
Hypercum nitidum	**Carolina St. John's-wort**	**S1**							**X**
Ilex amelanchier	sarvis holly	S3		X				X	X
Ipomopsis rubra	**red standing-cypress**	**S2**	**X**						**X**
Isoetes piedmontana	**Piedmont quillwort**	**S2**			**X**				
Isoetes riparia	river bank quillwort	S2						X	
Juglans cinerea	white walnut	S3					X		
Juncus abortivus	pine-barrens rush	SNR							X
Lechea torreyi	**Torrey's pinweed**	**SNR**							**X**
Liatris microcephala	small-headed gayfeather	S1					X		X
Limnothlypis swainsonii	Swainson's Warbler	S4		X					
Lindera subcoriacea	bog spicebush	S3							X
Liparis lilifolia	**lily-leaved twayblade**	**S1**					**X**		
Listera australis	southern twayblade	S2		X					
Litsea aestivalis	**pond spice**	**S3**						**X**	
Lobelia boykinii	Boykin's lobelia	S3						X	
Lobelia sp. 1 (batsoni)	Batson's lobelia	SNR				X			

Scientific Name	Common Name	Status/ Rank	CAL	DOR	FAI	LEX	NEW	ORA	RIC
Ludwigia spathulata	**spatulate seedbox**	**S3**							**X**
Lycopus cokeri	**Carolina bugleweed**	**S2**	**X**			**X**			**X**
Macbridea caroliniana	bog mint	S3							X
Magnolia macrophylla	big-leaved magnolia	S1		X					X
Magnolia pyramida	**pyramid magnolia**	**S1**	**X**				**X**		**X**
Melanthium virginicum	Virginia bunchflower	S2	X						
Menispermum canadense	**Canada moonseed**	**S2S3**	**X**	**X**			**X**		
Micrurus fulvius	eastern coral snake	S2				X			
Minuarta uniflora	**single-flowered stichwort**	**S3**			**X**				
Monotropsis odorata	sweet pinesap	S2					X		
Myotis austroriparius	Southeastern Bat	S1		X				X	
Myriophyllum laxum	loose watermilfoil	S2				X		X	X
Narthecium americanum	bog asphodel	C/SH		X					X
Neotoma floridana floridana	Eastern Woodrat	S3S4		X					
Nestronia umbellula	**Indian olive**	**S3**	**X**						**X**
Nolina georgiana	**Georgia beargrass**	**S3**						**X**	**X**
Notropsis chiliticus	**Red-lipped Shiner**	**S1?**							**X**
Ophioglossum vulgatum	southern adder's-tongue fern	S2			X				X
Osmorhiza claytonii	sweet cicely	S2			X				
Oxypolis ternata	**savannah cowbane**	**S1**				**X**			
Paspalum bifidum	bead-grass	S2							X
Philadelphus hirsutus	hairy mock-orange	S2			X		X		
Pilea fontana	springs clearweed	SNR	X	X					
Pituophis melanoleucus	Pine or Gopher Snake	S3S4						X	
Pityopsis pinifolia	**pine-leaved golden aster**	**S2**				**X**			**X**
Plagiochila sullivantii	Sullivant's liverwort	SNR							X
Plantago sparsiflora	pineland plantain	S2		X				X	
Platanthera lacera	green fringed orchid	S2							X
Polygala nana	dwarf milkwort	S1				X			
Ponthieva racemosa	shadow-witch orchid	S2	X						
Potamogeton confervoides	algae-like pondweed	S1							X
Potamogeton foliosus	leafy pondweed	SNR						X	
Prunus alabamensis	Alabama black cherry	S1							X
Pseudacris feriarum	Upland Chorus Frog	S5	X						
Pseudobranchus striatus	Dwarf Siren	ST/S2						X	
Psilotum nudum	**whisk fern**	**S1**							**X**
Pteroglossaspis ecristata	spiked medusa	S2		X					X
Pyganodon cataracta	Eastern Floater	SNR						X	X
Quercus oglethorpensis	Oglethorpe's oak	S3							X
Quercus similis	bottomland post oak	S1						X	
Rano capito	Gopher Frog	SE/S1						X	

Scientific Name	Common Name	Status/ Rank	CAL	DOR	FAI	LEX	NEW	ORA	RIC
Rhexia aristosa	awned meadowbeauty	S3						X	X
Rhinichthys atratulus	**Black-nosed Dace**	**S1**							**X**
Rhododendron eastmanii	**May white**	**S1**	**X**		**X**		**X**		**X**
Rhododendron flammeum	Piedmont azalea	S3						X	
Rhynchospora alba	white beakrush	SX				X			
Rhynchospora harperi	Harper's beakrush	S1						X	
Rhynchospora inundata	drowned hornrush	S2?				X			X
Rhynchospora leptocarpa	narrow-fruited beakrush	S1				X			
Rhynchospora macra	large beakrush	S1							X
Rhynchospora oligantha	few-flowered beakrush	S2							X
Rhynchospora pallida	pale beakrush	S1							X
Rhynchospora stenophylla	Chapman's beakrush	S2				X			X
Rhynchospora tracyi	Tracy's beakrush	S3						X	
Rorippa sessiliflora	**stalkless yellowcress**	**SNR**				**X**			
Sagittaria isoetiformis	slender arrow-head	S3					X		
Sarracenia rubra	**sweet pitcher-plant**	**S4**							**X**
Scirpus erimaniae	sharp-scaled bulrush	SNR							X
Scirpus etuberculatus	Canby's bulrush	SNR							X
Scirpus subterminalis	water bulrush	SNR					X		
Sciurus niger	**Eastern Fox Squirrel**	**S4**	**X**					**X**	**X**
Scleria baldwinii	**Baldwin's nutrush**	**S2**						**X**	
Scutellaria parvula	**dwarf skullcap**	**S2S3**			**X**				
Sedum pusillum	**granite rock stonecrop**	**S2**			**X**				
Seminatrix pygaea	Black Swamp Snake	SNR				X			
Spilogale putorius	Eastern Spotted Skunk	S4							X
Sporobolus teretifolius	**wire-leaved dropseed**	**S1**				**X**			
Sterna antillarum	Least Tern	S3		X					
Strophitus undulatus	Creeper	S2							X
Stylisma pickeringii var. pickeringerii	**Pickering's morning-glory**	**S2**				**X**			
Symphyotrichum georgianum	**Georgia aster**	**C/SNR**			**X**				**X**
Sylvilagus aquaticus	Swamp Rabbit	S2S3							X
Tofieldia glabra	**white false-asphodel**	**S1S2**							**X**
Toxolasma pullus	Savannah lilliput	S1							X
Tradescantia virginiana	Virginia spiderwort	S1						X	
Trepocarpus aethusae	aethusa-like trepocarpus	S1							X
Tridens carolinianus	**Carolina fluff grass**	**S2**				**X**		**X**	
Tridens chapmanii	Chapman's redtop	S1							X
Trillium pusillum var. pusillum	least trillium	S2	X	X					

Scientific Name	Common Name	Status/ Rank	CAL	DOR	FAI	LEX	NEW	ORA	RIC
Tyto alba	Barn Owl	S4							X
Ursus americanus	Black Bear	S3?					X		X
Urtica chamaedryoides	weak nettle	S2	X						X
Uricularia olivacea	Piedmont bladderwort	S2						X	
Utterbackia imbecilis	Paper Pondshell	SNR						X	
Vaccinium crassifolium var. sempervirens	Rayner's blueberry	S1				X			X
Villosa delumbis	Eastern Creekshell	S4			X			X	X
Viola pubescens var. leiocarpon	yellow violet	S2					X		
Warei cuneifolia	Nuttall's warea	S1							X
Xyris chapmanii	Chapman's yellow-eyed grass	S1				X			
Xyris stricta	pineland yellow-eyed grass	S1		X					

Underlining indicates animal species.

Bold indicates species found with five miles of study corridors.

C-federal candidate species; SE-endangered statewide; ST-threatened statewide; S1-critically imperiled statewide; S2-imperiled statewide; S3-vulnerable statewide; S4-secure statewide; SH-historic occurrence statewide; SX-thought to be extinct statewide.

COUNTIES: CAL-Calhoun; DOR-Dorchester; FAI-Fairfield; LEI- Lexington; NEW-Newberry; ORA-Orangeburg; RIC-Richland.